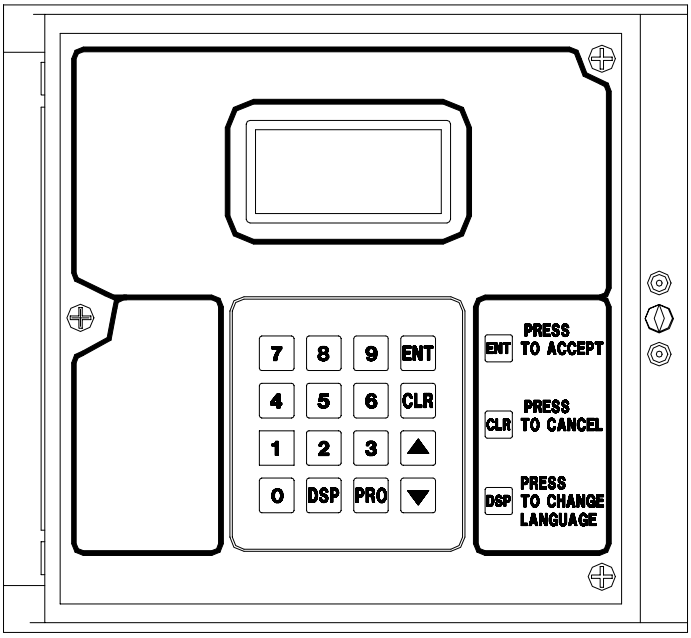
LAKEWOOD INSTRUMENTS
MODEL 2430P

MICROPROCESSOR-BASED CONDUCTIVITY CONTROLLER

INSTALLATION & OPERATION MANUAL

SERIAL #:_____



Lakewood Instruments

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http://www.lakewoodinstruments.com

LONWORKS is a registered trademark of Echelon Corporation.

IMPORTANT

CAUTION
CHEMICAL FEED

All electromechanical devices are subject to failure from a variety of causes. These include mechanical stress, component degradation, electromagnetic fields, mishandling, improper setup, physical abuse, chemical abuse, improper installation, improper power feeds and exposure.

While every precaution is taken to insure proper functioning, extra precautions should be taken to limit the ability of over-feeding by limiting chemical quantities available, secondary shut-downs, alarms and redundancy or other available methods.

CAUTION
POWER SOURCE AND WIRING

Low voltage wiring and high voltage (110 plus) should not be run in the same conduit. Always run separately. Even shielded low voltage is not a guarantee of isolation.

Every precaution should be taken to insure proper grounding and elimination of shorting or Electromagnetic field (EMF) interference.

Lakewood Instruments

We thank you for your selection and purchase of a Lakewood Instruments product.

With proper care and maintenance, this device should give you many years of trouble-free service. Please take the time to read and understand this Installation and Operation Manual, paying special attention to the sections on **OPERATION** and **MAINTENANCE**.

If, in the future, any parts or repairs are required, we strongly recommend that only original replacement parts be used. Our Customer Service Department is happy to assist you with your parts or service requests.

☎ **Lakewood Instruments Customer Service and Technical Support Departments can be reached by calling (800) 228-0839 or faxing (414) 355-3508, Monday through Friday, 7:30 a.m. - 5:00 p.m. CST.**

Mail should be sent to:

Lakewood Instruments
7838 North Faulkner Road
Milwaukee, WI 53224 USA

MODEL 2430P

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INTRODUCTION

LONWORKS Technology

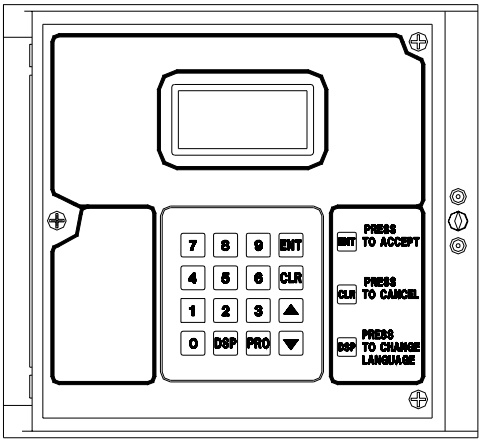
The Model 2250 is a LONWORKS Technology based conductivity controller with plumbing and flow switches. LONWORKS Technology gives you a high level of flexibility. The Model 2250 is user-friendly, with a large screen and keypad, access to multiple inputs and easy setup. This controller can easily be upgraded in the field. It's a combination of reliability, accuracy, security and simplicity.

- **COMMUNICATION** — Setting and reading the controller can be done remotely with the **-RS2L** computer option. This data link can connect directly to a personal computer (PC) or through a modem and phone line to any modem-equipped PC.

- **SECURITY** — A password system can be established which requires a user password to be able to make changes or do anything more than just read the controller readout. An operator password can help ensure that the system will be operated only by authorized personnel. A third level of security, the **Technician Level Menu**, can require a different password to be able to change any of the basic controller settings.

- **LANGUAGES** — Your controller is bilingual. You can order the controller so it can operate in either English/Spanish, English/French or English/German. If no preference is indicated, the default-programmed English/Spanish model will be sent. To switch languages, all you have to do is press the **DSP** button.

MODEL 2430P
MICROPROCESSOR-BASED CONDUCTIVITY AND ORP CONTROLLER



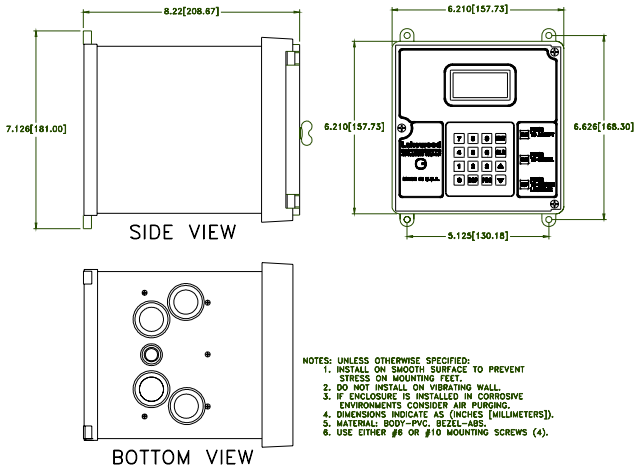
LONWORKS® Technology is the latest in microprocessor capability that gives the user the highest level of application flexibility. A large illuminated graphics screen, multiple inputs and very easy setup with easy field upgrade characterize this new technology. The unit does not include plumbing or a sensor. For use with process-type conductivity sensors (order separately).

FEATURES

- 4-electrode conductivity input includes fouling compensation and alarm.
- Differential ORP sensor input with diagnostics indicate fouled reference or open PT band.
- Input for flowswitch lockout.
- Two watermeter inputs, MTR1 and MTR2.
- Conductivity Blowdown Relay options:
  - Bleed x gallons for every x gallons makeup
  - Bleed x minutes for every x gallons of makeup
  - Bleed by setpoint
  - Bleed by cycles of concentration with **NCON/NCKT** Option
  - Bleed by multi-setpoint selected with **NCON/NCKT** Option
- Three user-selectable relay options (four additional with **NRLY**):
  - Feed by setpoint, direct or reverse;
  - Water meter actuated feed. MTR1, MTR2 or sum;
  - Feed after blowdown by percent of bleed time;
  - Feed by percentage of time;
  - Feed by schedule (**-RTC** Option);
  - General alarm contact.
- Three security levels:
  - View only
  - Operator
  - Technician
- Four different languages.
  - English Spanish (standard)
  - English French (optional)
  - English German(optional)

SPECIFICATIONS

Inputs	
Power	80-300 VAC
Sensor	2 or 4 electrode Conductivity and ORP glass Electrode w/BNC
Temperature comp.	None, 500 NTC, 4K NTC, 10K NTC, 100 PTC, 1K PTC, 3K PTC and 10K PTC
Flow / level switch	Dry contact
Water Meter Input	Two contacting head or open collector.
Outputs	
Relays	3 Amps @ 120 VAC
4-20 mA	Two, isolated w/-35L
Controller	
Conductivity Range	0-100,000 (varies with sensor)
Conductivity Accuracy	±40 µS
Conductivity Resolution	10µS
ORP Range	-1000 to +1000 mV
ORP Accuracy	±5 mV
ORP Resolution	1 mV
Deadband	Adjustable
Setpoints	Direct or Reverse (configurable in the field)
Feed timer	Adjustable
Keypad	Numeric
Display	Illuminated 128x64 pixel LCD
Ambient Temperature	32-158°F (0-70°C)
Enclosure	ABS Plastic NEMA 4X Optional


8.22[208.67]
7.126[181.00]
SIDE VIEW
6.210[157.73]
6.210[157.73]
6.626[168.30]
5.125[130.18]
BOTTOM VIEW
NOTES: UNLESS OTHERWISE SPECIFIED:
1. INSTALL ON SMOOTH SURFACE TO PREVENT STRESS ON MOUNTING FEET.
2. DO NOT INSTALL ON VIBRATING WALL.
3. IF ENCLOSURE IS INSTALLED IN CORROSIVE ENVIRONMENTS CONSIDER AIR PURGING.
4. DIMENSIONS INDICATE AS (INCHES [MILLIMETERS]).
5. MATERIAL: BODY-PVC, BEZEL-ABS.
6. USE EITHER #8 OR #10 MOUNTING SCREWS (4).

2430P LONWORKS Technology-based controller with 4 selectable relays for HIGH/LOW setpoints or alarms. Requires ORP and conductivity sensor (530, 540, or 543) which must be ordered separately. Controller has no power cord, outlets or plumbing.

CONTROLLER OPTIONS (optional; select no more than three)

-RTC Schedule feed timer with 28-day programmable clock for selectable relays.
-35L Two 4-20 mA output configurable for remote data acquisition of ORP and conductivity.
-RS2L Communications node with the *LRWS* program; requires **-RTC** Option.
-NIN Network interface node; allows 1 **NRLY** and/or up to 3 **NCON**/**NCKT**s to be added.

ENCLOSURE OPTIONS (optional)

-DU Duplex outlet for chemical pump, power cord.

LANGUAGE OPTIONS (optional, choose one, English and Spanish Standard)

-EF English and French.
-EG English and German.

REMOTE NODE OPTIONS (optional; MUST purchase -NIN Option above)

NRLY Four additional relays with enclosure (1 per 2000 Series Controller).
NCON Conductivity node (node only).

MOUNTING OPTIONS

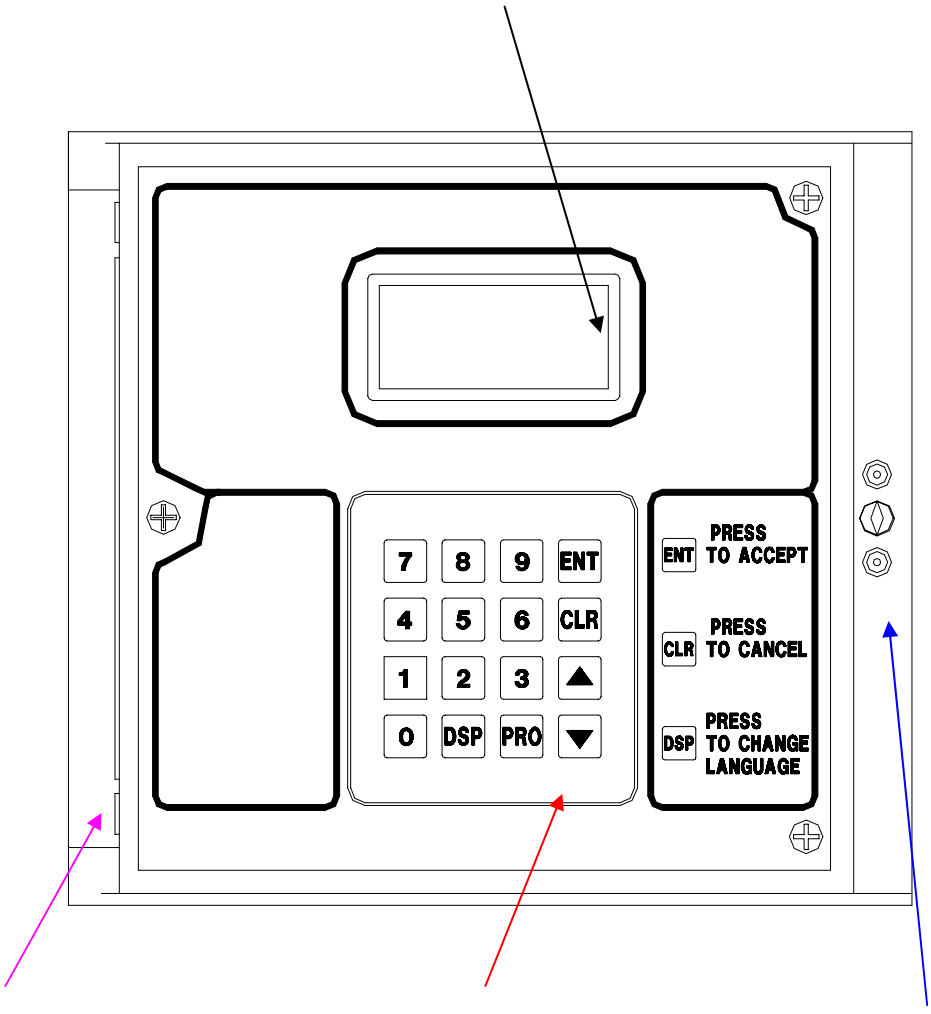
PM Panel mount 6 ¼" square cutout.
BM Bracket for pipe mounting.

SOFTWARE AND EXTERNAL MODEMS

LRWS *Windows*-based software for computer to communicate with 2000 Series Controllers.
MD4X High-Baud modem in NEMA 4X enclosure ready to power.
MD High-Baud modem for use with 2000 Series Controllers.

Front Panel Description

ILLUMINATED LCD
A large, 128x64 pixel graphic display makes it easy to read the menu-driven program.



ENCLOSURE
A sturdy enclosure protects your controller. Make sure it is properly mounted (SEE: **INSTALLATION; Mounting**). The weatherproof enclosure provides NEMA 4X protection. The controller does not have outlets or a power cord and must be hardwired through ½" conduit knockouts.

16-BUTTON KEYPAD
ENT = for Menu selection and/or acceptance of selected values.
CLR = to exit a Menu selection and/or skip input options.
DSP = to change languages.
PRO = to program a Menu selection.

LOCK SCREW
The lock screw keeps your circuit boards secure and provides easy access for wiring and setup. Simply turn the lock screw and pull open the front panel.

INSTALLATION

Checking

Inspect the shipping carton for obvious external damage. Note on the carrier's bill-of-lading the extent of the damage, if any, and notify the carrier. Save the shipping carton until your Model 2250 controller is started up.

☎ **If there was shipping damage, call the Lakewood Instruments Customer Service Department at (800) 228-0839 and return the controller to the factory in the original carton.**

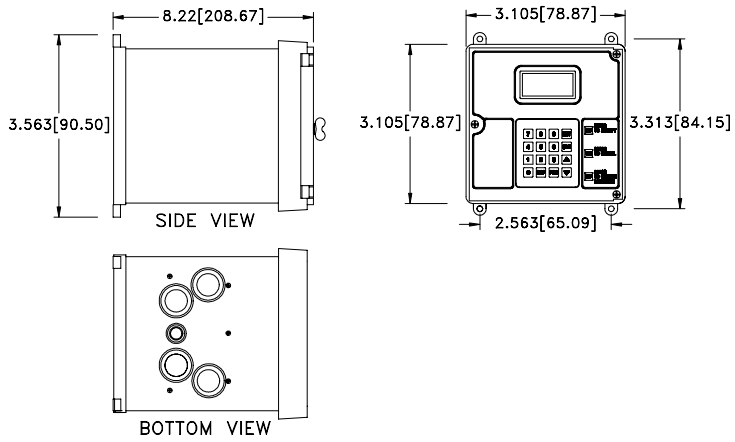
Mounting

Mount the Model 2250 controller on a FLAT, NON-VIBRATING wall.

Avoid drilling or punching additional holes in the controller enclosure, or it will no longer meet NEMA 4X protection standards. Damage incurred as a result of any alteration to the enclosure is not covered under the Lakewood Instruments product warranty.

NOTE: EXCESSIVE HEAT AND/OR DIRECT SUNLIGHT EXPOSURE WILL DARKEN THE LCD DISPLAY SCREEN, MAKING IT DIFFICULT TO READ, AND MAY SHORTEN THE LIFE OF OTHER ELECTRONIC COMPONENTS.

Outline and Dimensions



- Install on smooth surface to prevent stress on mounting feet.
- Do not install on vibrating wall.
- If enclosure is installed in corrosive environments, consider purging.
- Dimensions indicated as inches (millimeters).
- Material: Body—PVC; Bevel—ABS.
- Use either #6 or #10 mounting screws (4).

Plumbing

🕮 **Refer to sensor manual for plumbing instructions.**

NOTE: MAKE SURE YOUR COMPONENTS ARE SUITABLE FOR THE TEMPERATURE AND PRESSURE OF YOUR STEAM SYSTEM.

☎ **If you have questions or need assistance, call Lakewood Instruments Customer Service Department at (800)228-0839, Monday-Friday, 7:30 a.m. - 5:00 p.m. CST.**

WARNING! NEVER INJECT CHEMICALS UPSTREAM FROM THE CONTROLLER FLOWCELLS!

WARNING! DO NOT PLUMB THE INSTALLATION DIFFERENTLY THAN SHOWN ON THE DRAWINGS. IF YOU MUST PLUMB DIFFERENTLY, FAX A SKETCH OF THE PROPOSED REVISION TO LAKEWOOD INSTRUMENTS FOR PREINSTALLATION EVALUATION AND COMMENTS.

Watermeters

The 2430P can work with various water meters. We recommend you use and contacting head water meter or a open collector turbine meter. Other water meters may require the WMI option. Here are some commonly used meters

- Autotrol 1 and 2 inch turbines
- Seametrics MR series (contacting head)
- Seametrics WP open collector turbines
- Signet 2535 and 2540 open collector paddle wheel.

Wiring

The Model 2430P controller is equipped with a terminal block inside and three (3) conduit locations at the bottom of the enclosure. It has internal relays suitable for motor loads up to 5 Amps or 1/6 horsepower.

☎ **If you need more current capacity, contact Lakewood Instruments and order the -HR option with 25-Amp rated interposing relays.**

Make sure the circuit is not operative while connections are being made. Double-check for proper grounding. **DO NOT** install sensor wires in the same conduit with 120 VAC or power wiring. Doing so is not safe and results in inaccurate control. It is usually a violation of electrical codes as well.

The Model 2430P controller can operate on a wide range of AC voltage without need for internal changes. The circuit breaker in the power circuit to the controller should be sized to handle the combination of all the loads connected to the controller. If 250 VAC is used, be sure the motorized valve and other controlled devices are also rated at 250 VAC.

Install conduit and fittings in the knockouts provided in the bottom of the enclosure. Access the power terminals by opening the cover and loosening the lock screw on the left side of the panel. Be sure to connect the **green ground wire** to the TA lug #1 (also marked "EARTH GROUND") on the grounding plate. The **white neutral wire** goes to TA#2 or TA#3 (both also marked "NEUTRAL"). The **hot blowdown valve open-and-close wires** go to TB#1 and TB#3 (both in the area marked "OUTPUT") respectively. Wire the other accessories similarly, referring to drawings #5104109 and #5104110.

Power wiring and signal wiring (low voltage) such as sensor wires **MUST NOT** occupy the same conduit. Connect low-voltage wiring according to drawing #5104111. It is also recommended that you install seal-off compound in the conduit fitting at the controller end of the sensor conduit and a small vent hole to the outside to protect the controller from damage in the instance of sensor damage and leakage.

If you are installing the explosion-proof enclosure, be sure to use appropriate explosion-proof conduit fittings as required by electrical codes.

WARNING! DO NOT PLUG IN CHEMICAL PUMPS THAT ARE LARGER THAN 1/6 HORSEPOWER. THE CONTROL RELAYS ARE INTENDED FOR ELECTRONIC OR SMALL MOTOR-DRIVEN CHEMICAL PUMPS. LARGER PUMPS REQUIRE THE -HR OPTION WITH 25-AMP-RATED INTERPOSING RELAYS. CONTACT LAKEWOOD INSTRUMENTS FOR SPECIAL INSTRUCTIONS.

Write your wiring installation notes here:

Check the Operation

After installation is completed, follow these instructions:

- Make sure the controller has power and is operating.
- Press any key on the keypad and you will see the **Main Menu** on the screen.
- Use the ↑ and ↓ arrow keys to move through the menu.

Reinitialization

It is suggested that you reinitialize the controller before programming in your own numbers. This will wipe out any random settings which may be in the controller. To do so, follow these instructions:

- After you have practiced moving up and down in the **Main Menu**, press **7** or highlight **SYSTEM SETUP** and press **ENT**.
- Press **2** or highlight **INITIALIZATION** and press **ENT**.
- Press **3** or highlight **WHOLE CONTROLLER** and press **ENT**. A warning will appear on the screen, advising you that "this option requires re-calibration and re-programming!" Press **1** to proceed, **2** to cancel.

Node Installation

Conductivity nodes (NCON) and relay nodes (NRLY) must be installed before any programming can be accomplished.

- Select node to install (refer to node installation section of manual).
- You will be prompted to press the service pin on the node. It is a small black button located on the node. When the button is pressed a yellow LED will illuminate. The service pin should be depressed for about ½ second during node installation.
- Repeat process until all nodes are installed.
- Repeat Reinitialization process above after nodes are installed.
- Programming of the 2255 can begin.

Testing

Continue to test the controller's accessories by following these instructions:

- Get back to the **Main Menu**.
- Press **1** or highlight **PROCESS** and press **ENT**. The screen that appears will have a top portion that deals with conductivity and a lower portion that has four boxes labeled **BLOW**, **CHM1**, **CHM2** and **CHM3**. These are the relays that switch on the alarms and other accessories the controller operates. There may be a dark flashing line separating the two sections; this indicates which alarms are active at the moment. As shown at the bottom of the screen, press **ENT** to access the relays.
- The four relays line up vertically with boxes that are blank when the relay is not in operation. Select a relay by pressing its number. The box will change (probably it will become shaded), indicating that the relay has reversed its status from **OFF** to **ON**. Each time you press the number, the relay reverses its status. Any changes made to the relays will last five minutes before the relays go back on automatic control.
- Finally, press **CLR** twice to return to the **Main Menu**.

Calibration

When in the Process display screen press the **PRO** key to calibrate.

Conductivity

It is necessary to have an accurate reading of the process water to properly calibrate the controller. A hand-held conductivity meter that tests the sample is best. Once you have attained a reading, immediately enter the value into the controller. Use the number keys to enter the value, then press **ENT**. When the number is accepted, you will see the **SPAN COMPLETE** screen before the LCD display switches back to the original **PROCESS** screen. Then take a second sample with a hand-held conductivity meter and confirm the reading on the display.

ORP (single point)

It is necessary to have an accurate reading of the process water to properly calibrate the controller. A hand-held ORP meter that tests the sample is best. Once you have attained a reading, immediately enter the value into the controller. After pressing **PRO** choose **ORP**, then **ZERO**. Use the number keys to enter the value, then press **ENT**. When the number is accepted, you will see the **ZERO COMPLETE** screen before the LCD display switches back to the original **PROCESS** screen. Then take a second sample with the hand-held meter and confirm the reading on the display.

ORP (two point)

A millivolt simulator is required for a two point calibration. With the simulator at 0 mV do a zero calibration.

If at any time the calibration is improperly entered you may initialize the calibration to restore it to default values.

Conductivity Setpoint

After you have tested the controller's accessories, you need to establish the controller's setpoint for operation. Check with your water treatment engineer to determine what conductivity setpoint your system needs.

Follow these instructions to establish the controller's setpoint:

- From the **Main Menu**, press **3** or highlight **BLOWDOWN** and press **ENT**.
- Press **1** or highlight **SETPOINT** and press **ENT**.
- Simply use the keypad numbers to enter the proper conductivity setpoint and press **ENT**. When finished, you will automatically be moved down to the deadband setpoint.

Deadband

After the setpoint is established, the controller's deadband must also be set. "Deadband" refers to the amount of conductivity above and below the setpoint; a range within which the controller will not react. Because of continuous fluctuations in the conductivity level, it is necessary to have this deadband range. It should be a small percentage of the setpoint. Half the deadband amount will be automatically put above the setpoint, and the other half below.

For example, a conductivity setpoint of 1,000 μS with a deadband of 100 μS would result in a system that corrected to 950 μS and re-opened at 1,050 μS.

- Simply use the keypad numbers to enter the proper deadband setpoint and press **ENT**. When finished, you will automatically be switched to the blowdown timeout screen.

Blowdown Timeout

The blowdown timeout function is strictly an alarm feature; it will not close the blowdown valve. If a relay is designated as an alarm relay, it will initiate after the blowdown time is exceeded. If you do not wish to utilize this function, simply program in a large amount of time, such as six (6) hours.

Language Levels

The Model 2430P controller is programmed in four (4) languages and can be ordered as English/Spanish, English/French or English/German. If no preference is indicated, the default-programmed English/Spanish version will be sent. You can change languages on the screen by pressing the **DSP** key. It's just that simple.

Security Levels

Using and setting the Model 2430P controller is not difficult.

The Model 2430P controller is menu-driven for easy use. Once you become familiar with the menu options, it will be easy to perform setup and calibration procedures.

This section of the manual provides a comprehensive overview of the entire menu as it can be viewed from each security level. In order to lead off with a complete look at the menu, the levels will be shown in the following order: 3) **Technician**, 2) **Operator** and 1) **View Only**. Once you review the instructions in this section and learn the menu options, you will be able to perform your own setup and calibration using these examples to guide you through the process.

The Model 2430P offers three (3) optional security levels: 1) **View Only**, 2) **Operator** and 3) **Technician**. A password is required to change from one security level to another. Each level has its own factory-preset password (1111 for Technician, 2222 for Operator), but your water treatment engineer can also designate personalized passwords from the **Technician Level Menu**.

NOTE: IF YOU USE PERSONALIZED PASSWORDS, MAKE SURE THEY ARE RECORDED IN A SAFE AND SECURE PLACE.

The following pages illustrate the menu screens available in each security level:

- **Biocide Sequence**
  This alarm simply tells you that a biocide is being feed.

- **No Flow**

Flow switch input is not closed. (a jumper wire is installed at factory across flow switch input)
Disables all relay outputs

- **Conductivity High Alarm**

Conductivity is higher than alarm set point.
Also opens up Bleed Valve (useful during biocide lock out).

- **Conductivity Low Alarm**

Conductivity lower than alarm set point

- **Bleed time exceeded**

Bleed time has occurred longer than bleed time out.

- **Setpoint Time Exceeded**

Relay has been on longer than programmed set point time out.
Useful when feeding chemical. Prevents overfeed by turning off relay.
To reset disable flow to controller to create a no flow alarm, then restore control.
Will also reset if setpoint is met.

- **Open or shorted TC**

Temperature Compensator is open or shorted on conductivity sensor (not used with standard boiler sensor).

- **Fouled Electrode**

Conductivity sensor is fouled, miswired or wires are broken.

- **Broken Electrode**

pH glass bulb or coaxial cable may be damaged.

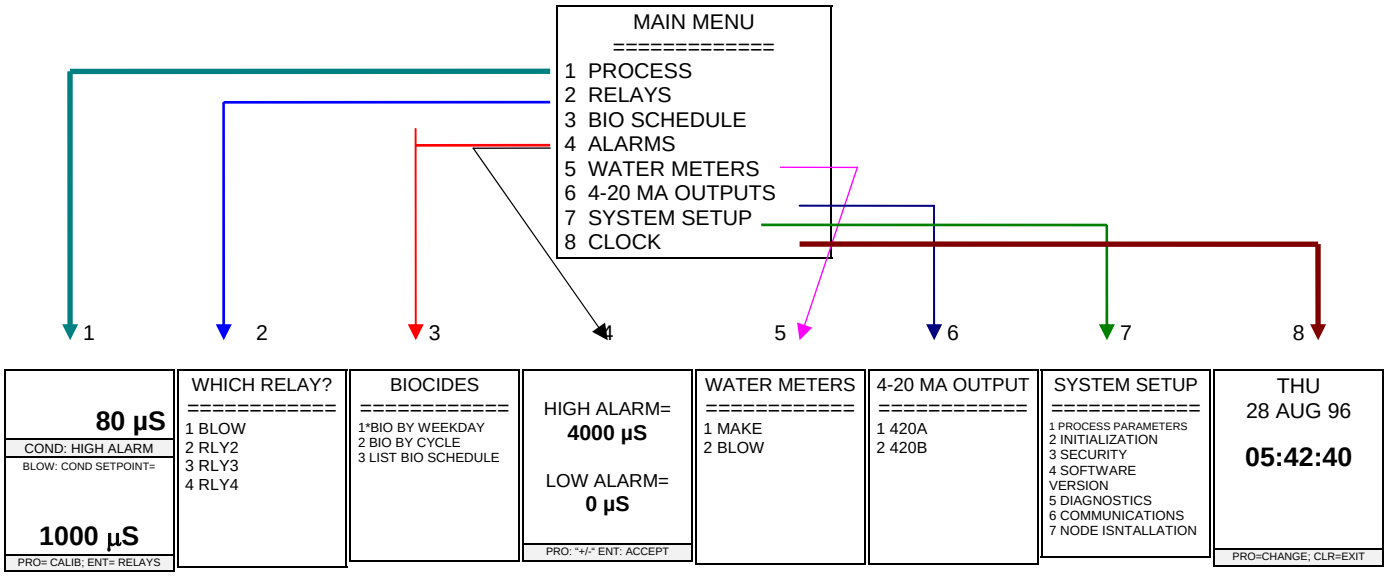
- **High Reference Z**

Solution ground or earth ground to controller is not properly connected. Reference on pH sensor is bad

Technician Level Menu

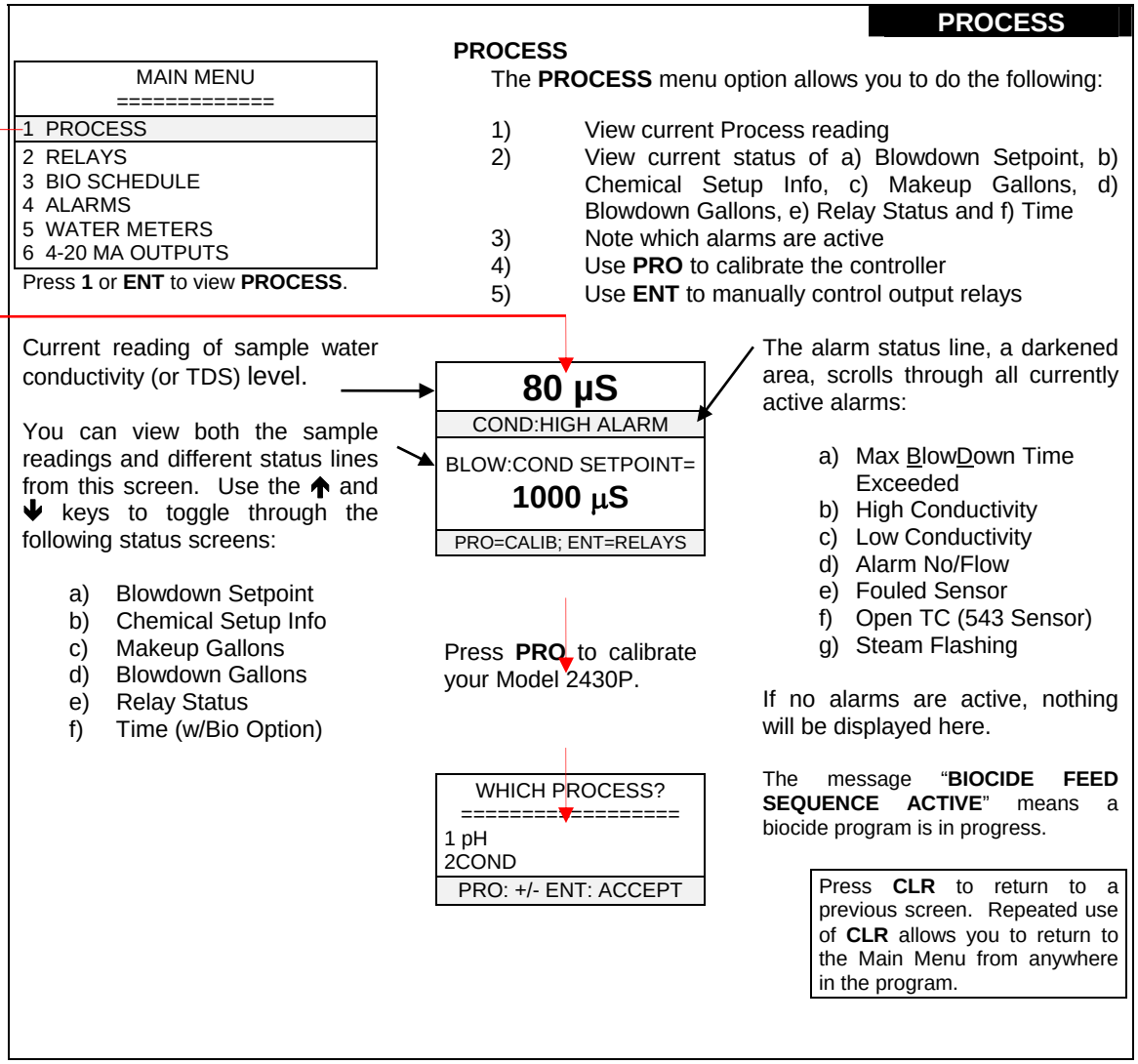
The complete **Main Menu** has 8 available options that can be accessed in the **Technician Level**. However, a list of only 6 options can be viewed at one time. Use the ↑ and ↓ keys to scroll through the options.

The **Technician Level** allows you to review the entire **Main Menu**. As an introduction, here is a graphic overview of the first level of each option in the **Main Menu** to see how it operates. Complete detail of each option is provided on the following pages.



Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return all the way back to the **Main Menu** from anywhere in the program.

TECHNICIAN LEVEL MENU


PROCESS
MAIN MENU
==========
1 PROCESS
2 RELAYS
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
Press 1 or ENT to view PROCESS.
PROCESS
The PROCESS menu option allows you to do the following:
1) View current Process reading
2) View current status of a) Blowdown Setpoint, b) Chemical Setup Info, c) Makeup Gallons, d) Blowdown Gallons, e) Relay Status and f) Time
3) Note which alarms are active
4) Use PRO to calibrate the controller
5) Use ENT to manually control output relays
Current reading of sample water conductivity (or TDS) level.
You can view both the sample readings and different status lines from this screen. Use the ↑ and ↓ keys to toggle through the following status screens:
a) Blowdown Setpoint
b) Chemical Setup Info
c) Makeup Gallons
d) Blowdown Gallons
e) Relay Status
f) Time (w/Bio Option)
80 µS
COND:HIGH ALARM
BLOW:COND SETPOINT=
1000 µS
PRO=CALIB; ENT=RELAYS
Press PRO to calibrate your Model 2430P.
WHICH PROCESS?
==========
1 pH
2COND
PRO: +/- ENT: ACCEPT
The alarm status line, a darkened area, scrolls through all currently active alarms:
a) Max BlowDown Time Exceeded
b) High Conductivity
c) Low Conductivity
d) Alarm No/Flow
e) Fouled Sensor
f) Open TC (543 Sensor)
g) Steam Flashing
If no alarms are active, nothing will be displayed here.
The message "BIOCIDE FEED SEQUENCE ACTIVE" means a biocide program is in progress.
Press CLR to return to a previous screen. Repeated use of CLR allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU

PROCESS
Relays

MAIN MENU
==========
1 PROCESS
2 RELAYS
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS

This part of the **PROCESS** menu shows the status and operation of the relays.

You can make temporary changes in their operation as described below:

Press **1** or **ENT** to view **PROCESS**.

80 µS
COND :HIGH ALARM
BLOW:COND SETPOINT=
1000 µS
PRO=CALIB; ENT=RELAYS

Press **ENT** to view the relays.

AUTO-MANUAL (5 MINS.)
(1) BLOW
(2) RLY2
(3) RLY3
(4) RLY4
PRESS 1-4; CLR=EXIT

This screen shows you the current status of the four relays. Simply press the number of the relay if you want to manually change a relay's status.

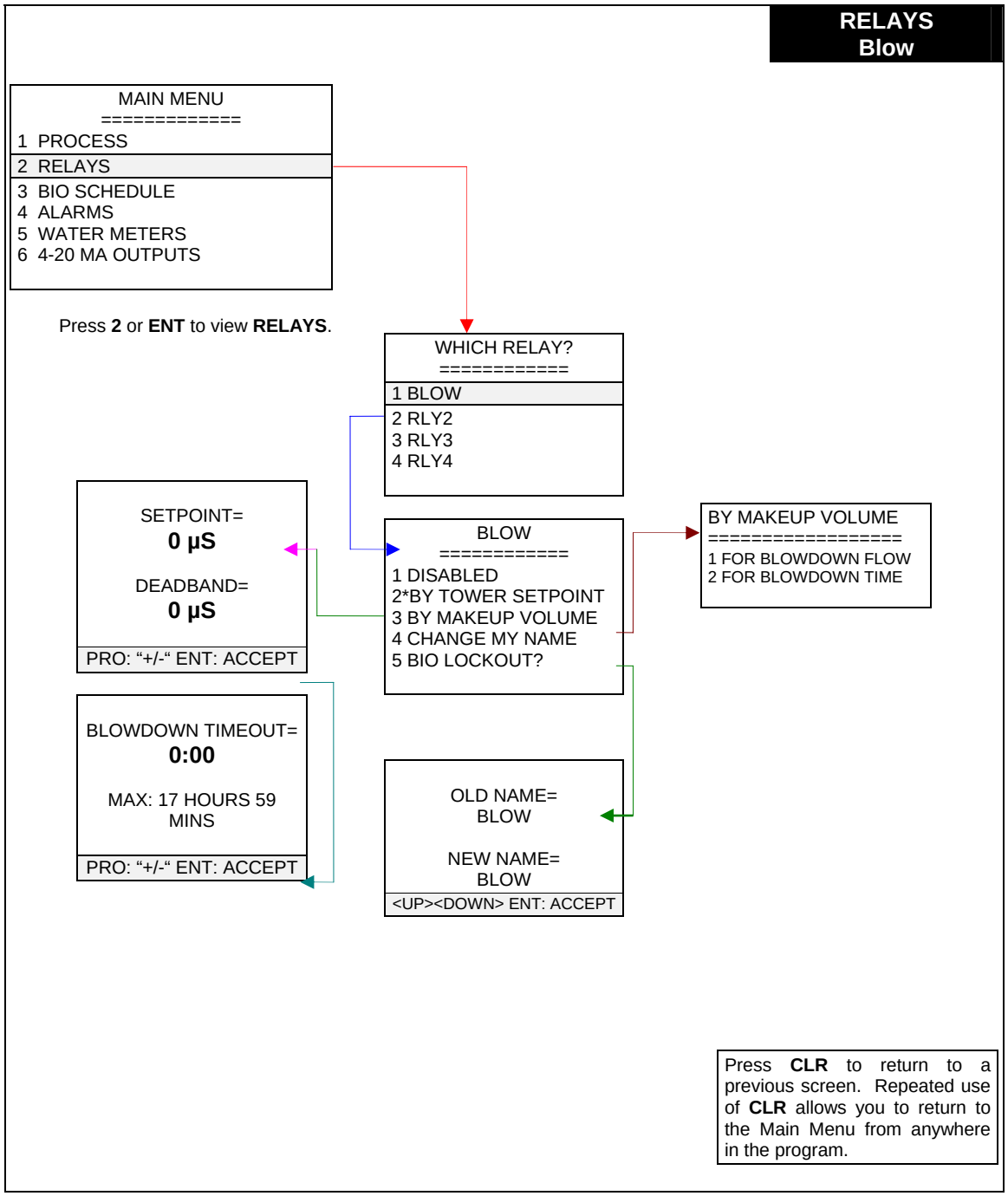
An automatic five-minute timer begins as soon as you change a relay. After five minutes pass, the relay returns to automatic control.

The timer will continue even if you exit the menu.

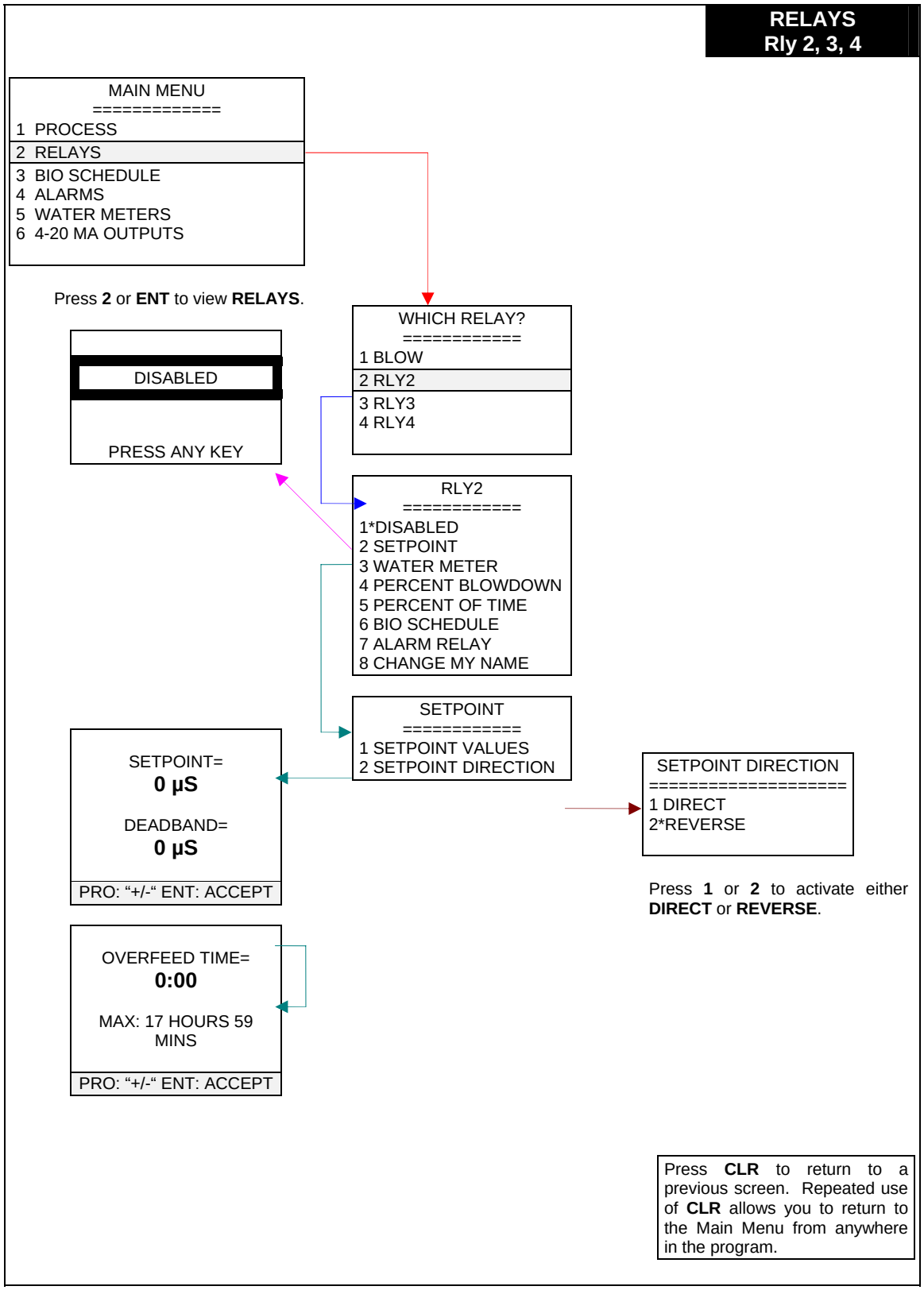
Press **CLR** to return to the **PROCESS** menu.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

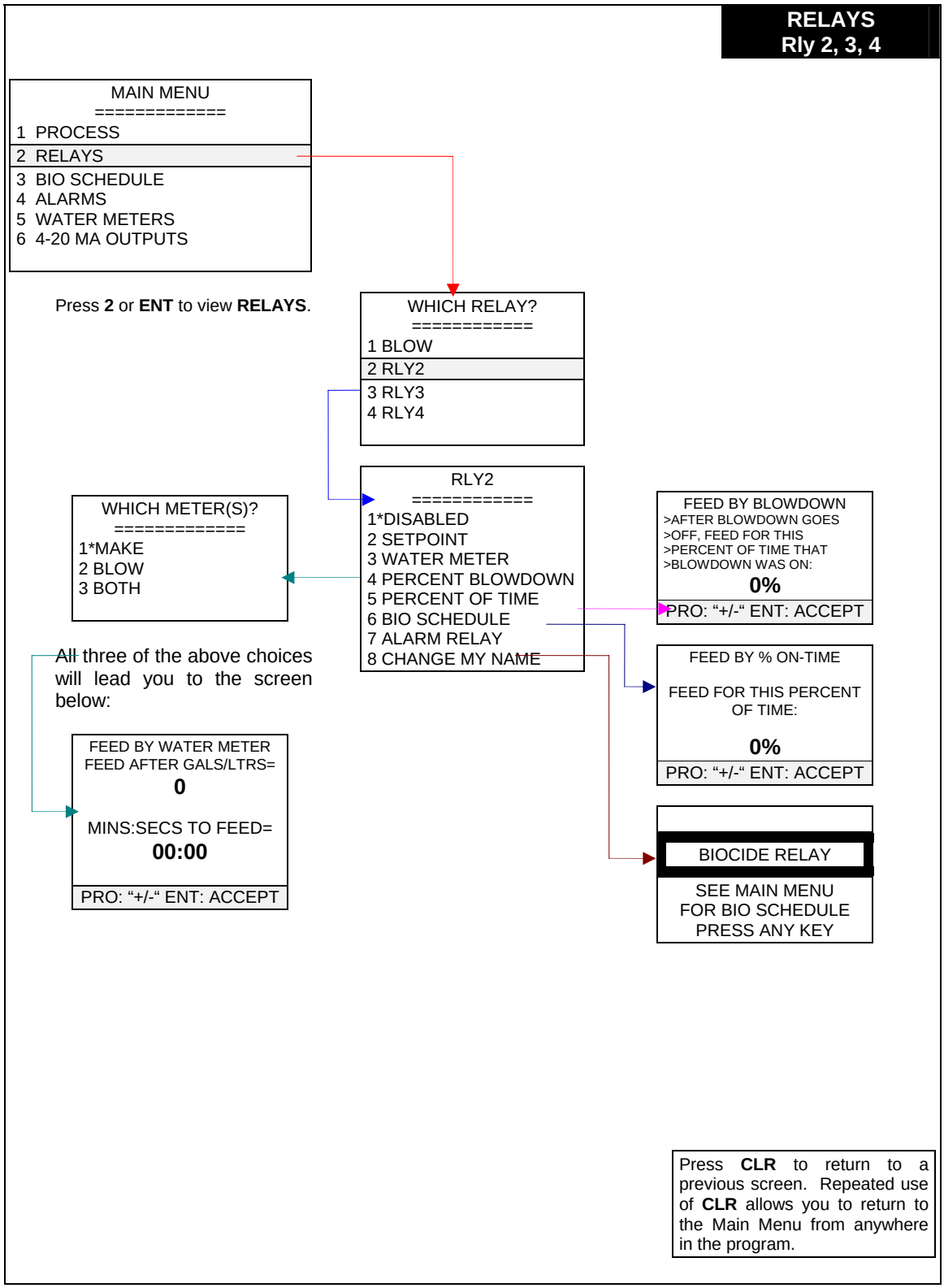
TECHNICIAN LEVEL MENU



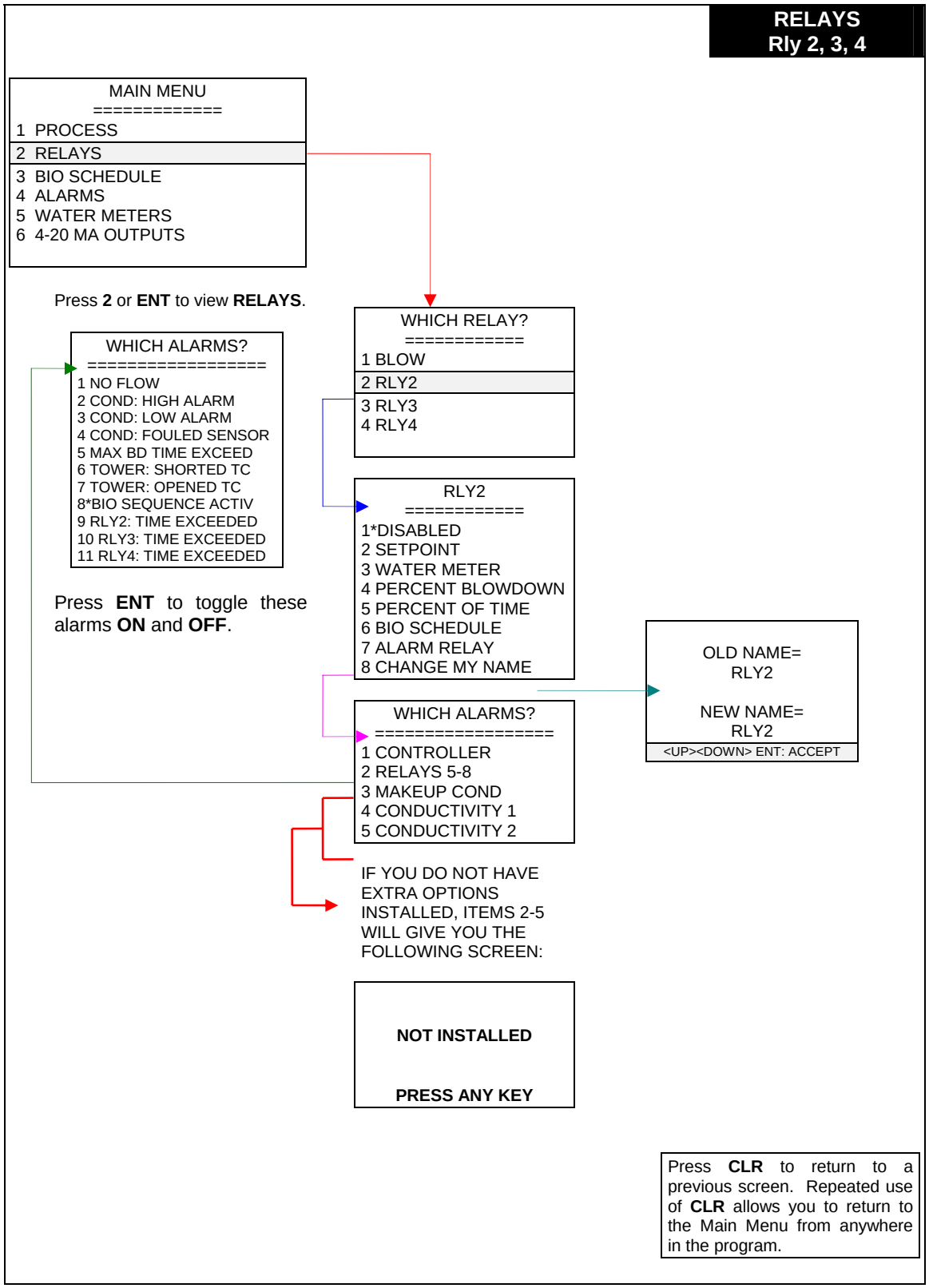
TECHNICIAN LEVEL MENU



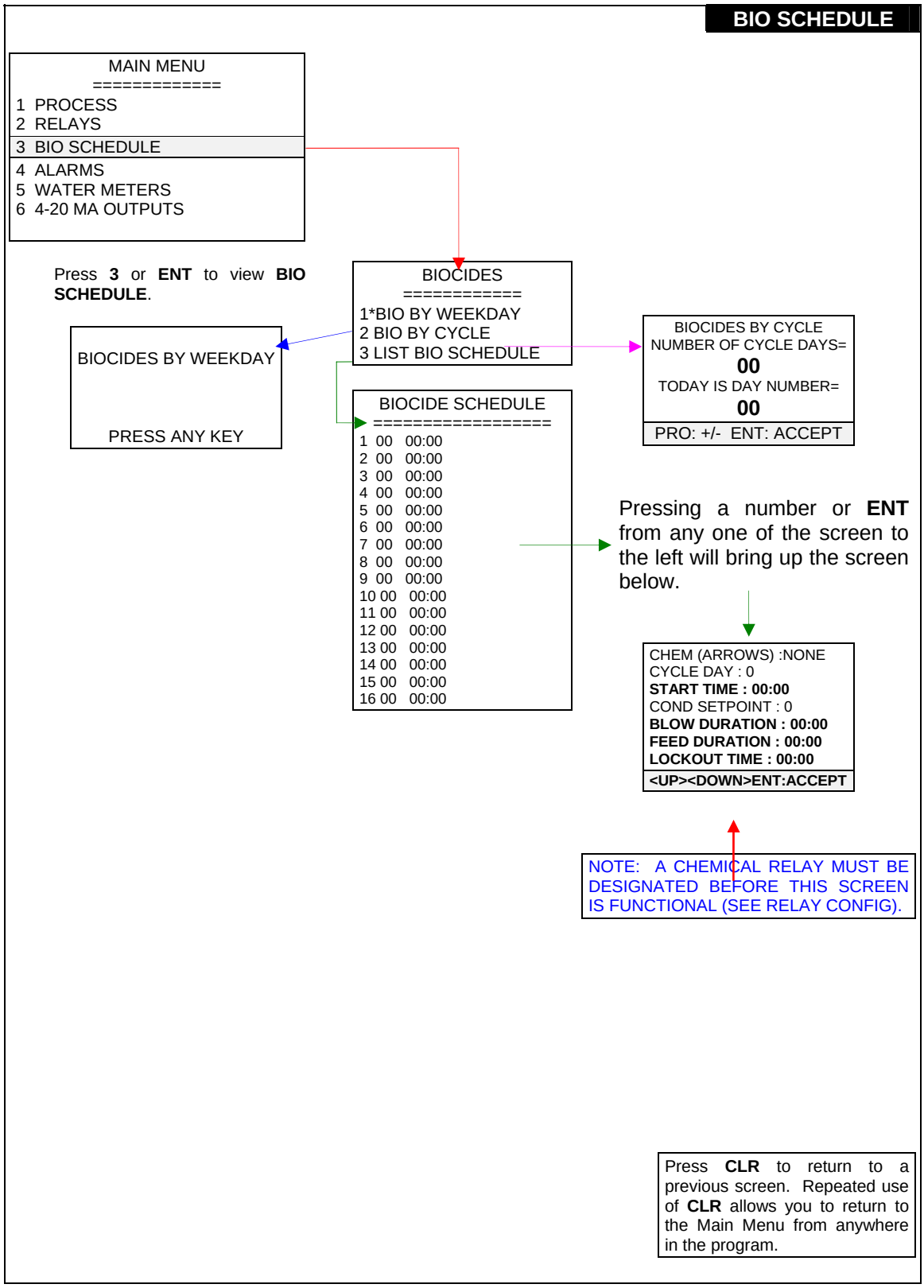
TECHNICIAN LEVEL MENU



TECHNICIAN LEVEL MENU



TECHNICIAN LEVEL MENU



TECHNICIAN LEVEL MENU

ALARMS

MAIN MENU
==========
1 PROCESS
2 RELAYS
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS

Press **4** or **ENT** to view **ALARMS**.

The Model 2430P is equipped with both high and low alarms. This menu option allows you to program the specific values for these alarms. Consult your water treatment specialist to determine the proper High and Low Alarm values for your system.

HIGH ALARM=
4000 µS

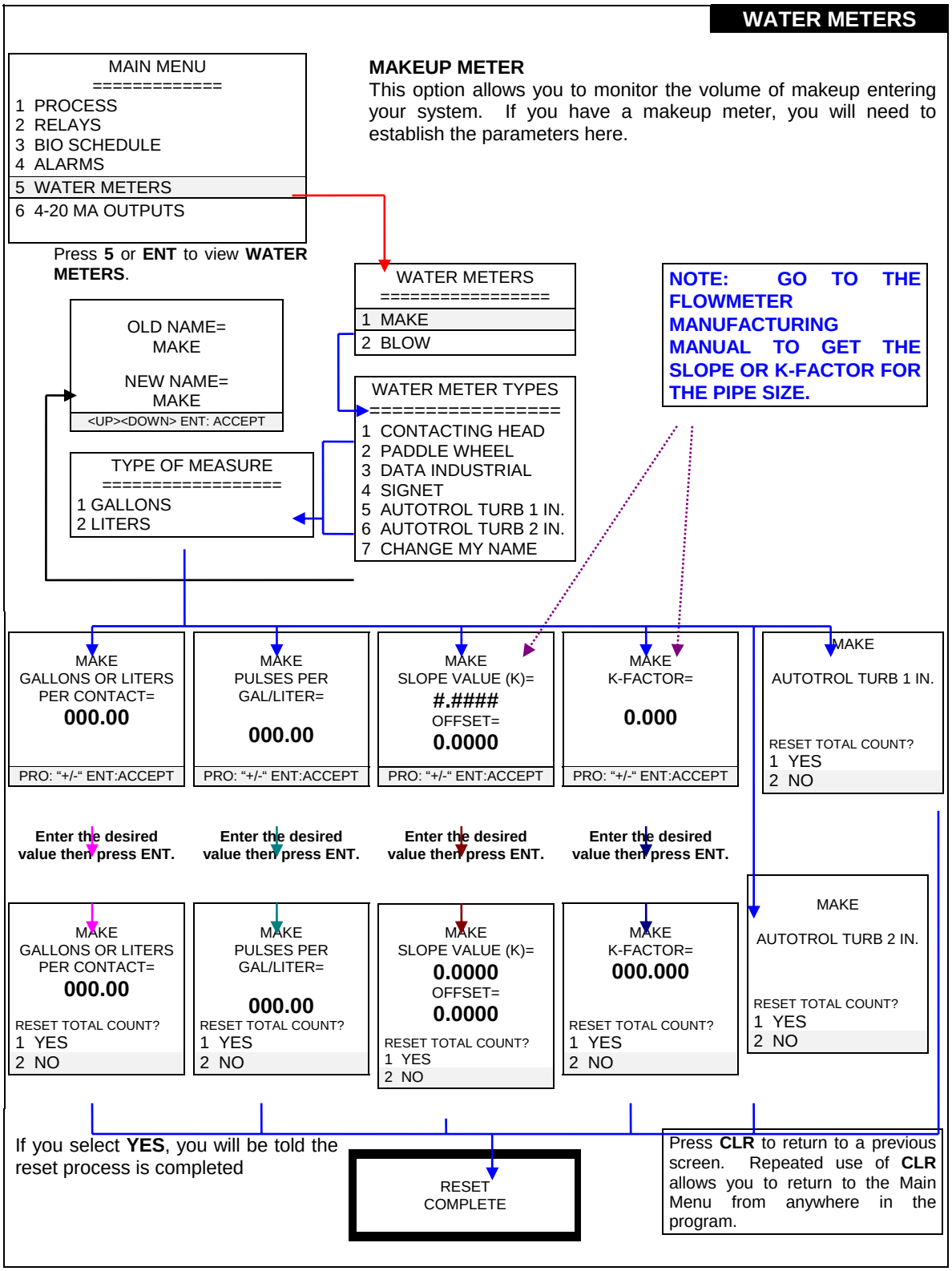
LOW ALARM=
0 µS

PRO: "+/-" ENT: ACCEPT

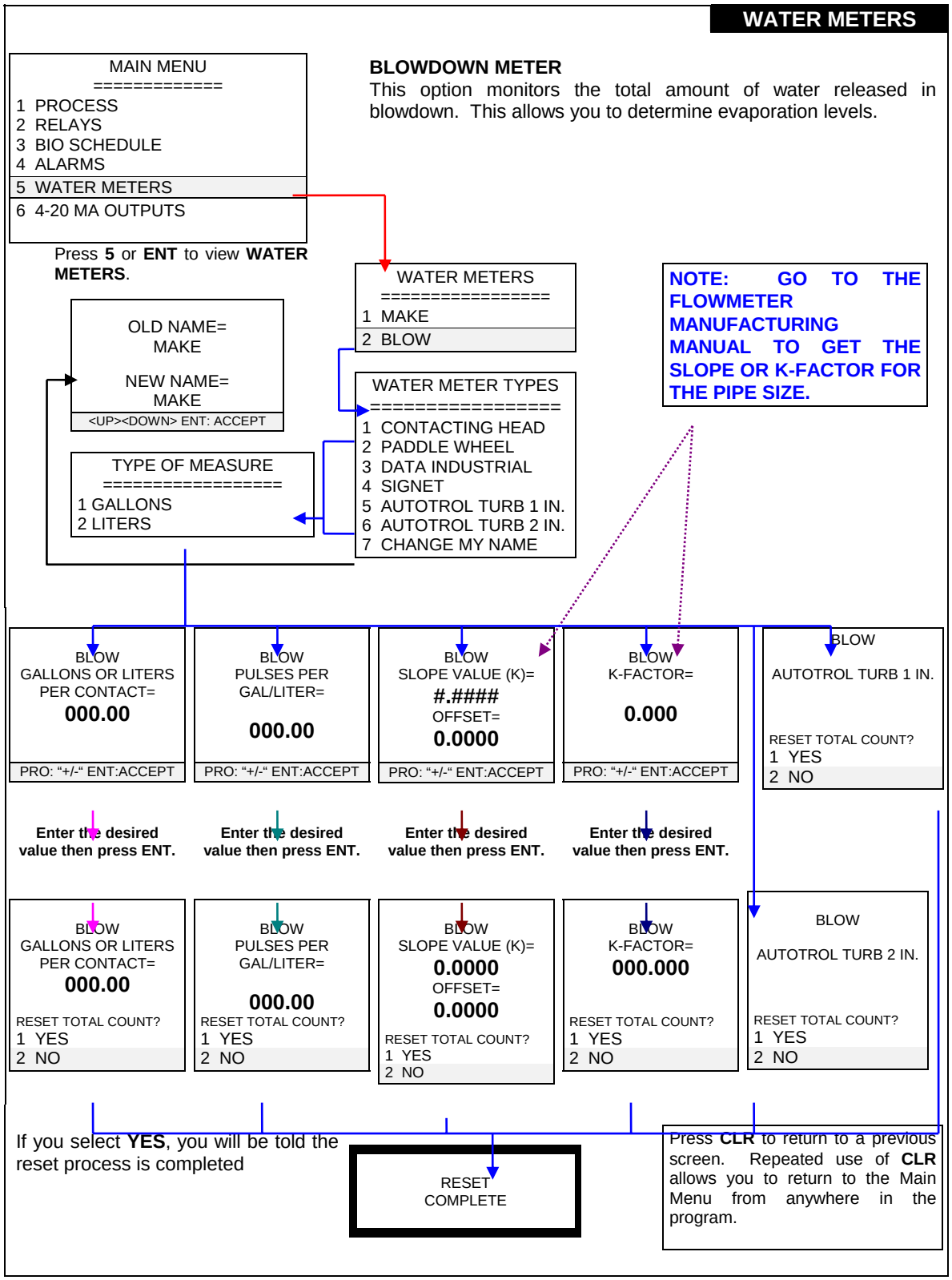
NOTE: A HIGH CONDUCTIVITY ALARM WILL OVERRIDE THE STANDARD SETPOINT AND FORCE A BLOWDOWN.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU

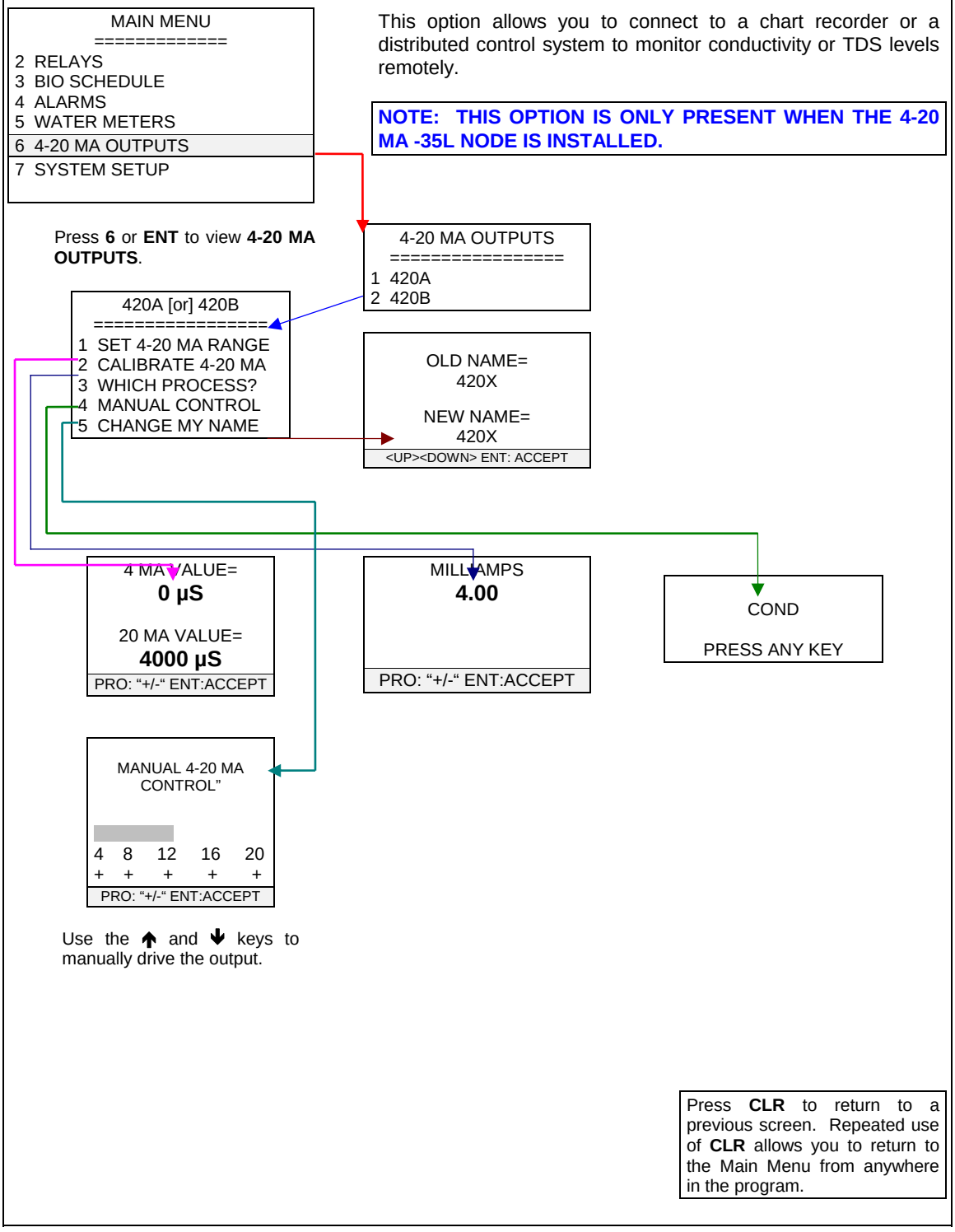


TECHNICIAN LEVEL MENU

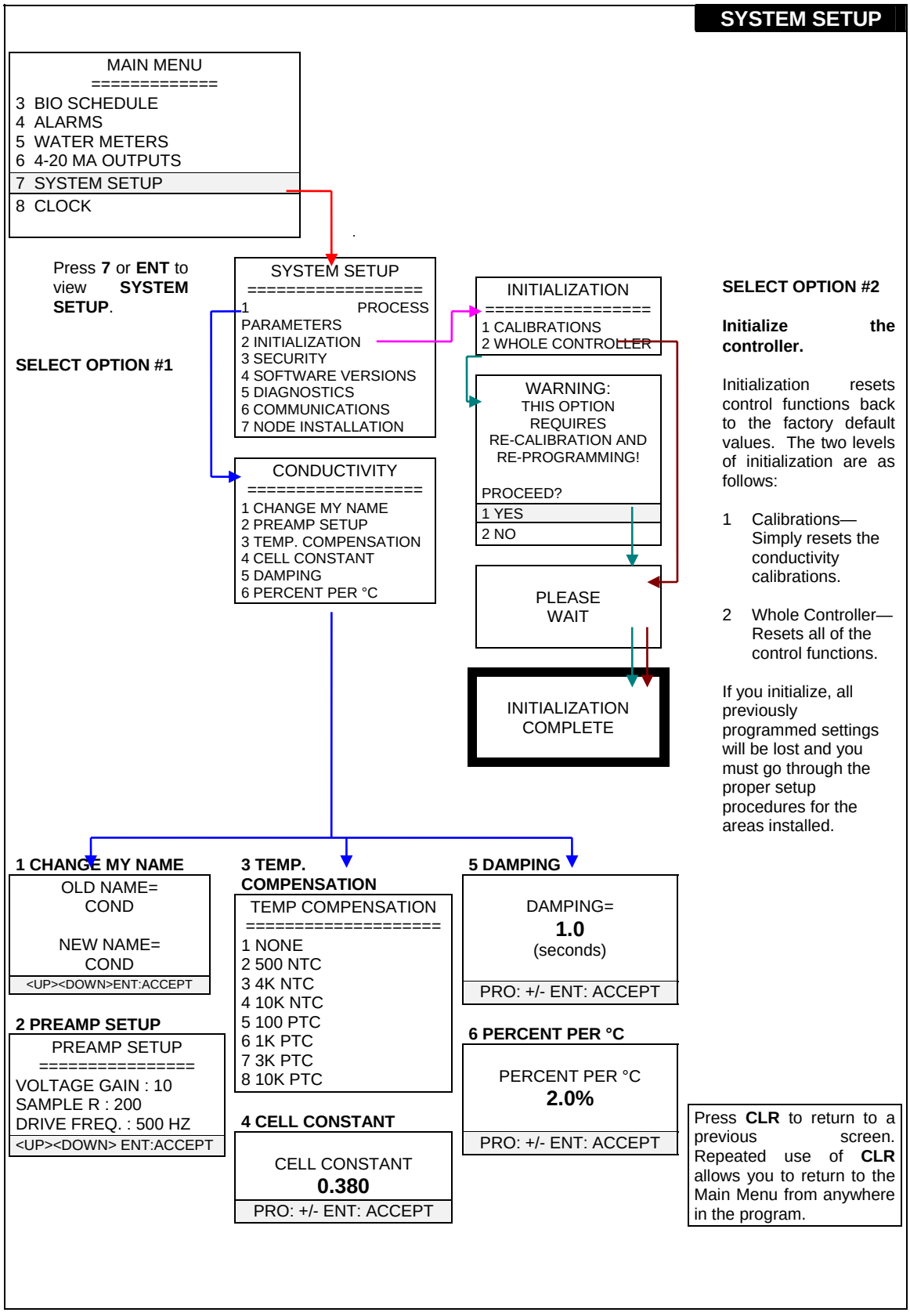


TECHNICIAN LEVEL MENU

4-20 MA OUTPUTS


MAIN MENU
==========
2 RELAYS
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
7 SYSTEM SETUP
This option allows you to connect to a chart recorder or a distributed control system to monitor conductivity or TDS levels remotely.
NOTE: THIS OPTION IS ONLY PRESENT WHEN THE 4-20 MA -35L NODE IS INSTALLED.
Press 6 or ENT to view 4-20 MA OUTPUTS.
4-20 MA OUTPUTS
==========
1 420A
2 420B
420A [or] 420B
==========
1 SET 4-20 MA RANGE
2 CALIBRATE 4-20 MA
3 WHICH PROCESS?
4 MANUAL CONTROL
5 CHANGE MY NAME
OLD NAME=
420X
NEW NAME=
420X
<UP><DOWN> ENT: ACCEPT
4 MA VALUE=
0 µS
20 MA VALUE=
4000 µS
PRO: "+/-" ENT:ACCEPT
MILLIAMPS
4.00
PRO: "+/-" ENT:ACCEPT
COND
PRESS ANY KEY
MANUAL 4-20 MA CONTROL"
4 8 12 16 20
+ + + + +
PRO: "+/-" ENT:ACCEPT
Use the ↑ and ↓ keys to manually drive the output.
Press CLR to return to a previous screen. Repeated use of CLR allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU



TECHNICIAN LEVEL MENU

SYSTEM SETUP

MAIN MENU
==========
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
7 SYSTEM SETUP
8 CLOCK

Press **7** or **ENT** to view **SYSTEM SETUP**.

SYSTEM SETUP
==========
1 PROCESS PARAMETERS
2 INITIALIZATION
3 SECURITY
4 SOFTWARE VERSIONS
5 DIAGNOSTICS
6 COMMUNICATIONS
7 NODE INSTALLATION

SELECT OPTION #3

Change the security password.

A password is assigned for each security level at the factory. For security reasons, you may desire to routinely change the passwords for the **Operator** and **Technician Level Menus**.

To change a password, select the security level you want to change (i.e., **Technician**), then enter the old password. If the old password is correct, you are asked to assign a new 4-key password.

NOTE: CHANGING THE OPERATOR PASSWORD DOES NOT PUT THE CONTROLLER INTO OPERATOR MODE. YOU WILL NEED TO RETURN THE CONTROLLER BACK INTO OPERATOR MODE FOR OPERATOR USE.

CHANGE PASSWORD
==========
1 OPERATOR
2 TECHNICIAN

OPERATOR

PASSWORDS ARE 4 KEYS
ENTER A NEW PASSWORD

OLD PASSWORD=****
NEW PASSWORD=****
VERIFY =****

WHICH NODE?
==========
1 CONTROLLER
2 MAKEUP COND
3 CONDUCTIVITY 1
4 CONDUCTIVITY 2

If you do not have the optional nodes installed, selecting 2-4 will leave the menu above on the screen.

CONTROLLER

C0=0014 C4=-474
C1=046A C5=0003
C2=0AAA C6=0538
C3=0-AB9 C7=02CC
LSB= 2.7

PRESS ANY KEY

SELECT OPTION #4

View the software version information.

This option is primarily for use when troubleshooting the Model 2430P. The Lakewood Instruments Technical Service Representative will need to know this information in order to properly diagnose your controller.

SOFTWARE VERSIONS
==========
1 MENU S1 REV XX
2 IO S1 REV XX
3 RTC S1 REV XX
4 420 S1 REV XX
5 COM S1 REV XX
6 NII S1 REV XX
7 NIO S1 REV XX
8
9
10
11

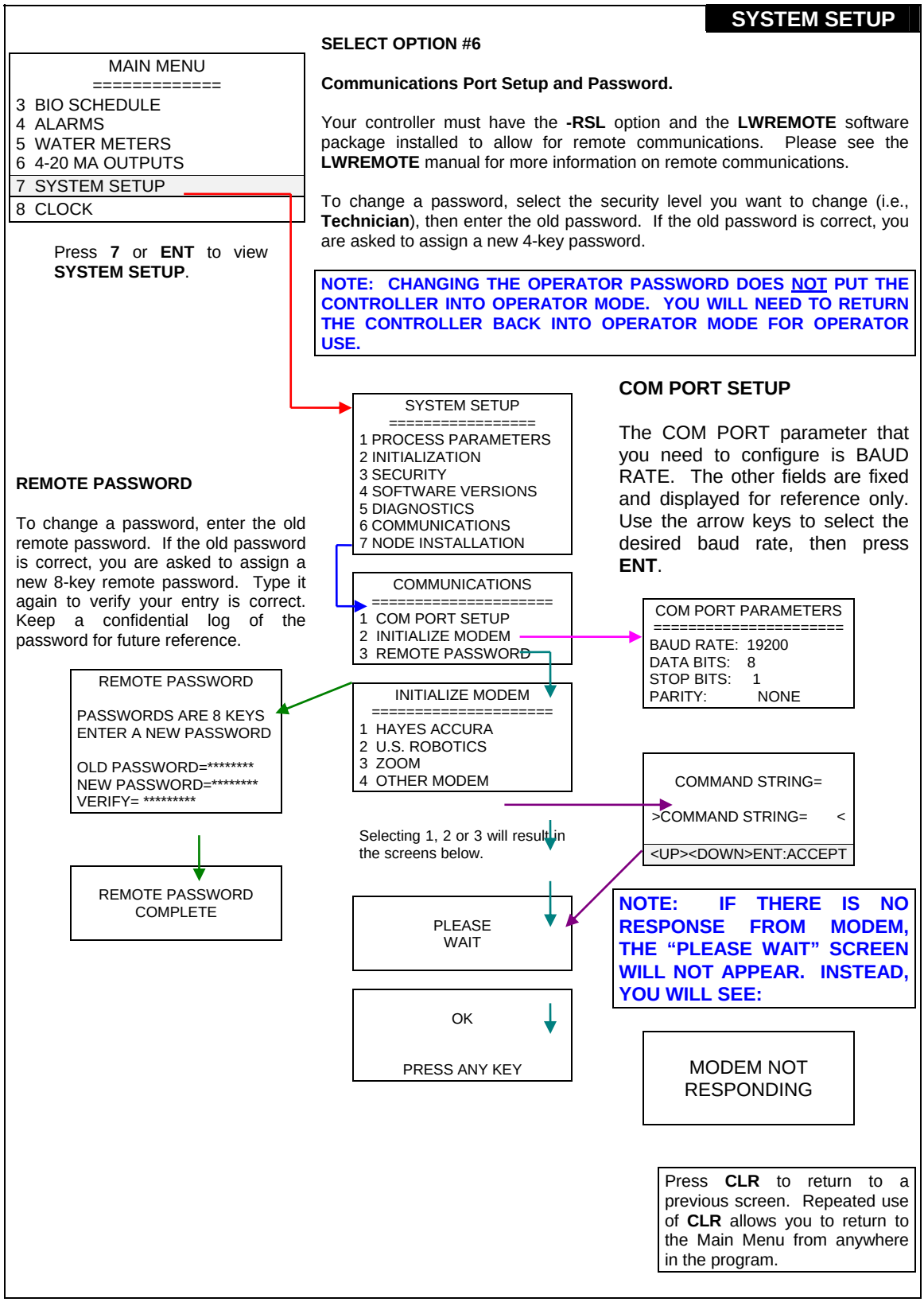
NOTE: SOFTWARE REVISION LETTERS (I.E., "XX") ARE FOR REFERENCE ONLY. YOUR MODEL MAY DIFFER.

SELECT OPTION #5
View raw A/D values.

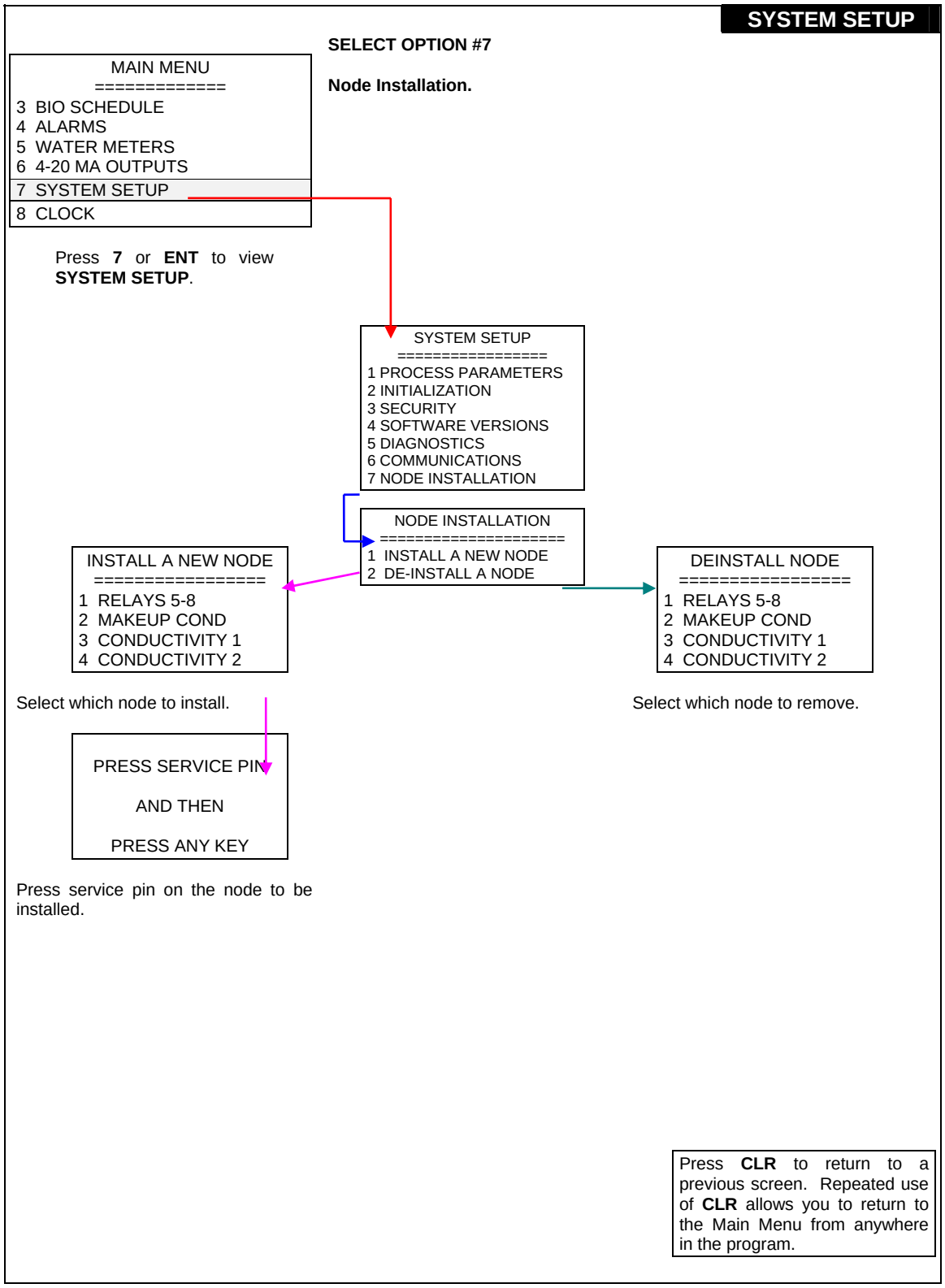
This option allows you to view the raw A/D values and may be useful when troubleshooting.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

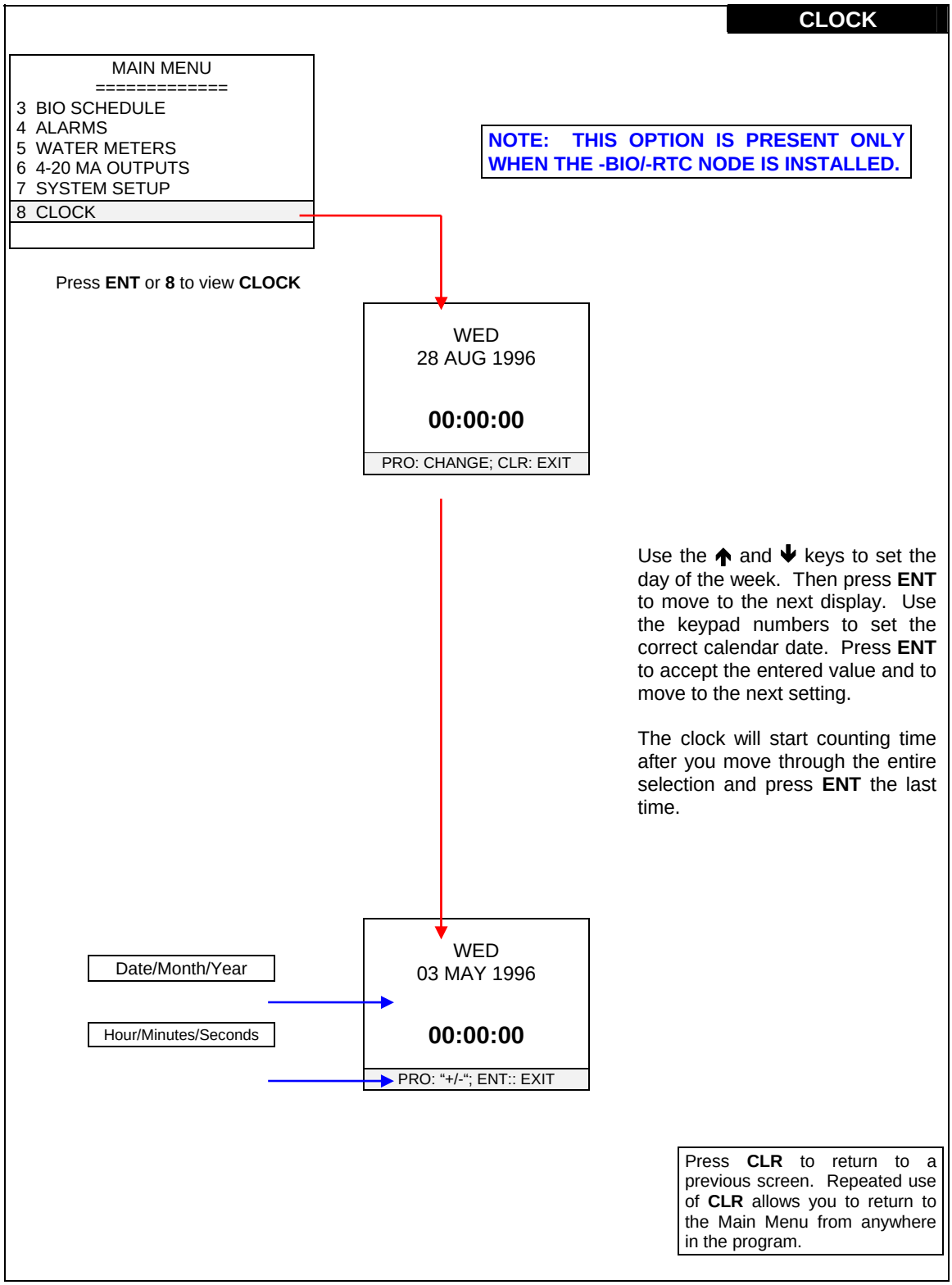
TECHNICIAN LEVEL MENU


SYSTEM SETUP
MAIN MENU
==========
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
7 SYSTEM SETUP
8 CLOCK
Press 7 or ENT to view SYSTEM SETUP.
SELECT OPTION #6
Communications Port Setup and Password.
Your controller must have the -RSL option and the LWREMOTE software package installed to allow for remote communications. Please see the LWREMOTE manual for more information on remote communications.
To change a password, select the security level you want to change (i.e., Technician), then enter the old password. If the old password is correct, you are asked to assign a new 4-key password.
NOTE: CHANGING THE OPERATOR PASSWORD DOES NOT PUT THE CONTROLLER INTO OPERATOR MODE. YOU WILL NEED TO RETURN THE CONTROLLER BACK INTO OPERATOR MODE FOR OPERATOR USE.
SYSTEM SETUP
==========
1 PROCESS PARAMETERS
2 INITIALIZATION
3 SECURITY
4 SOFTWARE VERSIONS
5 DIAGNOSTICS
6 COMMUNICATIONS
7 NODE INSTALLATION
COM PORT SETUP
The COM PORT parameter that you need to configure is BAUD RATE. The other fields are fixed and displayed for reference only. Use the arrow keys to select the desired baud rate, then press ENT.
REMOTE PASSWORD
To change a password, enter the old remote password. If the old password is correct, you are asked to assign a new 8-key remote password. Type it again to verify your entry is correct. Keep a confidential log of the password for future reference.
COMMUNICATIONS
==========
1 COM PORT SETUP
2 INITIALIZE MODEM
3 REMOTE PASSWORD
COM PORT PARAMETERS
==========
BAUD RATE: 19200
DATA BITS: 8
STOP BITS: 1
PARITY: NONE
REMOTE PASSWORD
PASSWORDS ARE 8 KEYS
ENTER A NEW PASSWORD
OLD PASSWORD=********
NEW PASSWORD=********
VERIFY= *********
INITIALIZE MODEM
==========
1 HAYES ACCURA
2 U.S. ROBOTICS
3 ZOOM
4 OTHER MODEM
COMMAND STRING=
>COMMAND STRING= <
<UP><DOWN>ENT:ACCEPT
Selecting 1, 2 or 3 will result in the screens below.
REMOTE PASSWORD COMPLETE
PLEASE WAIT
OK
PRESS ANY KEY
NOTE: IF THERE IS NO RESPONSE FROM MODEM, THE "PLEASE WAIT" SCREEN WILL NOT APPEAR. INSTEAD, YOU WILL SEE:
MODEM NOT RESPONDING
Press CLR to return to a previous screen. Repeated use of CLR allows you to return to the Main Menu from anywhere in the program.

TECHNICIAN LEVEL MENU



TECHNICIAN LEVEL MENU


CLOCK
MAIN MENU
==========
3 BIO SCHEDULE
4 ALARMS
5 WATER METERS
6 4-20 MA OUTPUTS
7 SYSTEM SETUP
8 CLOCK
NOTE: THIS OPTION IS PRESENT ONLY WHEN THE -BIO/-RTC NODE IS INSTALLED.
Press ENT or 8 to view CLOCK
WED
28 AUG 1996
00:00:00
PRO: CHANGE; CLR: EXIT
Use the ↑ and ↓ keys to set the day of the week. Then press ENT to move to the next display. Use the keypad numbers to set the correct calendar date. Press ENT to accept the entered value and to move to the next setting.
The clock will start counting time after you move through the entire selection and press ENT the last time.
Date/Month/Year
Hour/Minutes/Seconds
WED
03 MAY 1996
00:00:00
PRO: "+/-"; ENT:: EXIT
Press CLR to return to a previous screen. Repeated use of CLR allows you to return to the Main Menu from anywhere in the program.

SECURITY LEVELS

In order to change the security level (i.e., from **Technician** down to **Operator**, or from **Operator** to **View-Only**), go to the **Main Menu**.

```
MAIN MENU
==========
1  PROCESS
2  RELAYS
3  BIO SCHEDULE
4  ALARMS
5  WATER METERS
6  4-20 MA OUTPUTS
7  SYSTEM SETUP
8  CLOCK
```

Press **0** on the keypad. Note that **0** does not appear on the menu screen, only on the keypad.

```
SET SECURITY LEVEL
================
1  VIEW-ONLY
2  OPERATOR
```

Select the new security level.

```
CHANGE LEVEL TO
OPERATOR
?
WARNING:YOU SHOULD
KNOW THE PASSWORD
1  YES
2  NO
```

Select **YES** to change the security level.

```
OPERATOR

PRESS ANY KEY
```

The controller menu now functions at the new security level.
To increase the security level, go into the **PROCESS** screen:

```
80 µS
COND :HIGH ALARM
BLOW:COND SETPOINT=
1000 µS
PRO=CALIB; ENT=RELAYS
```

Enter the 4-digit security code that goes with the desired security level.
The **Technician** and **Operator** levels have different security codes.

Following the first power-up, the **Operator** code is **1111**.
Following the first power-up, the **Technician** code is **2222**.
You may change the passwords in the **SYSTEM SETUP** menu.

OPERATOR LEVEL MENU

PROCESS

MAIN MENU
==========
1 PROCESS
2 RELAYS

The Operator Level Menu allows you limited access to the **PROCESS** and **RELAYS** menus. In **PROCESS**, you can view the current conductivity or TDS level, any alarms and various status lines. You can also perform a calibration as shown below:

Press **1** or **ENT** to view **PROCESS**.

Current reading of sample water TDS and conductivity levels.

This line allows you to view one of six different status lines. To select the status to view, use the ↑ and ↓ keys to move through the list. Here's what is available:

a) Blowdown Setpoint
b) Chemical Setup Info
c) Makeup Gallons
d) Blowdown Gallons
e) Date/Time (with **-RTC** only)
f) Relay Status

80 µS
COND : HIGH ALARM
BLOW:COND SETPOINT=
1000 µS
PRO=CALIB; ENT=RELAYS

Press **PRO** to calibrate your Model 2430P.

CALIBRATION
2450 µS
PRO="+/-"; ENT=ACCEPT

The alarm status line, a darkened area, scrolls through all currently active alarms:

a) Max BlowDown) Time Exceeded
b) High Conductivity
c) Low Conductivity
d) Fouled Sensor (543 Probe only)
e) Broken TC (543 Probe only)
f) Steam Flashing

If no alarms are active, nothing will be displayed here.

NOTE: THE CONTROLLER MEASURES ONLY UN-NEUTRALIZED CONDUCTIVITY.

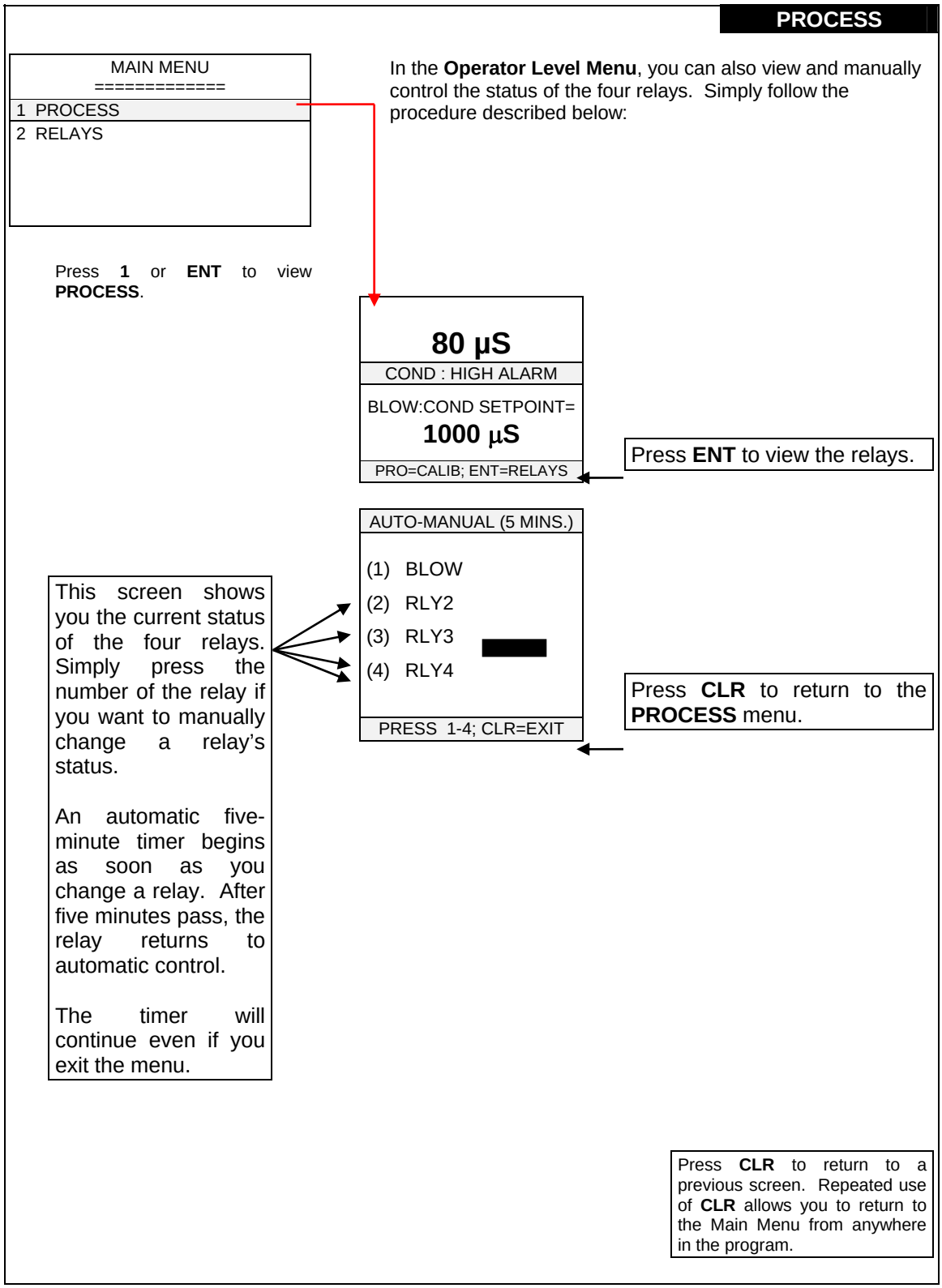
To perform a one-point calibration, have your water treatment specialist tell you the value you should enter (based on your water sample reading). Press **ENT** after you have keyed in the proper number. The calibration procedure is described in the **Technician Level Menu** pages of this manual.

ZERO
COMPLETE

80 µS
COND :HIGH ALARM
BLOW:COND SETPOINT=
1000 µS
PRO=CALIB; ENT=RELAYS

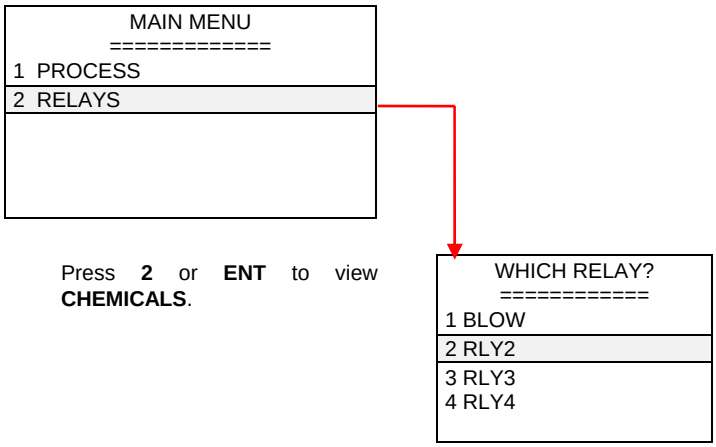
Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

OPERATOR LEVEL MENU


PROCESS
MAIN MENU
==========
1 PROCESS
2 RELAYS
In the **Operator Level Menu**, you can also view and manually control the status of the four relays. Simply follow the procedure described below:
Press **1** or **ENT** to view **PROCESS**.
80 µS
COND : HIGH ALARM
BLOW:COND SETPOINT=
1000 µS
PRO=CALIB; ENT=RELAYS
Press **ENT** to view the relays.
AUTO-MANUAL (5 MINS.)
(1) BLOW
(2) RLY2
(3) RLY3
(4) RLY4
PRESS 1-4; CLR=EXIT
This screen shows you the current status of the four relays. Simply press the number of the relay if you want to manually change a relay's status.
An automatic five-minute timer begins as soon as you change a relay. After five minutes pass, the relay returns to automatic control.
The timer will continue even if you exit the menu.
Press **CLR** to return to the **PROCESS** menu.
Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

OPERATOR LEVEL MENU

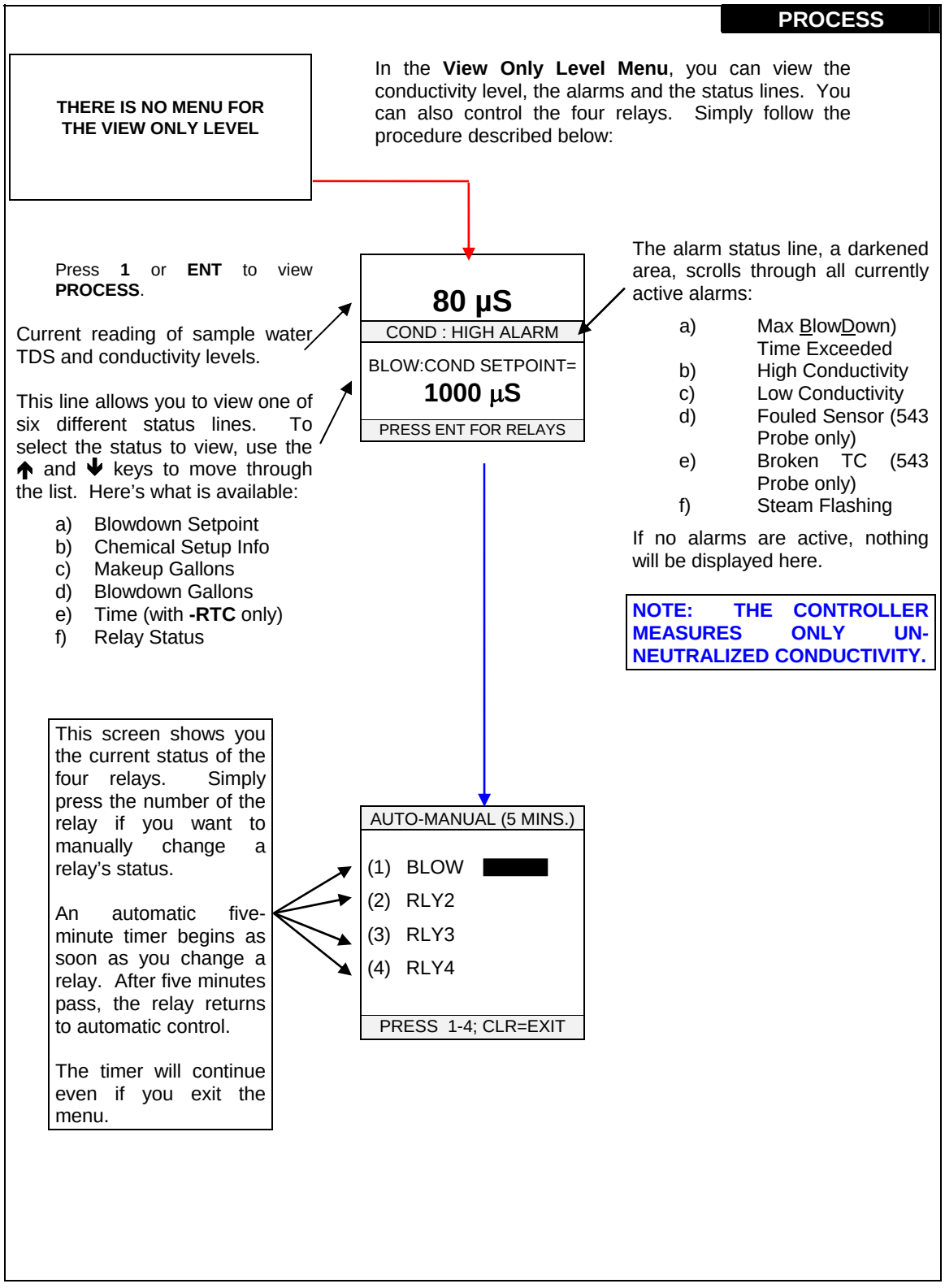
RELAYS



Press **2** or **ENT** to view **CHEMICALS**.

Press **CLR** to return to a previous screen. Repeated use of **CLR** allows you to return to the Main Menu from anywhere in the program.

VIEW ONLY LEVEL MENU


PROCESS
THERE IS NO MENU FOR THE VIEW ONLY LEVEL
In the View Only Level Menu, you can view the conductivity level, the alarms and the status lines. You can also control the four relays. Simply follow the procedure described below:
Press 1 or ENT to view PROCESS.
Current reading of sample water TDS and conductivity levels.
This line allows you to view one of six different status lines. To select the status to view, use the ↑ and ↓ keys to move through the list. Here's what is available:
a) Blowdown Setpoint
b) Chemical Setup Info
c) Makeup Gallons
d) Blowdown Gallons
e) Time (with -RTC only)
f) Relay Status
80 µS
COND : HIGH ALARM
BLOW:COND SETPOINT=
1000 µS
PRESS ENT FOR RELAYS
The alarm status line, a darkened area, scrolls through all currently active alarms:
a) Max BlowDown) Time Exceeded
b) High Conductivity
c) Low Conductivity
d) Fouled Sensor (543 Probe only)
e) Broken TC (543 Probe only)
f) Steam Flashing
If no alarms are active, nothing will be displayed here.
NOTE: THE CONTROLLER MEASURES ONLY UN-NEUTRALIZED CONDUCTIVITY.
This screen shows you the current status of the four relays. Simply press the number of the relay if you want to manually change a relay's status.
An automatic five-minute timer begins as soon as you change a relay. After five minutes pass, the relay returns to automatic control.
The timer will continue even if you exit the menu.
AUTO-MANUAL (5 MINS.)
(1) BLOW
(2) RLY2
(3) RLY3
(4) RLY4
PRESS 1-4; CLR=EXIT

Technical Service

☎ **Technical Support for Lakewood Instruments can be reached by calling (262) 238-4400 or faxing (262) 238-4402, Monday through Friday, 7:30 a.m. - 4:30 p.m. CST.**

Mail and returns should be sent to:

Lakewood Instruments
7838 North Faulkner Road
Milwaukee, WI 53224 USA

When any merchandise is returned to the factory, please call and obtain a return goods authorization (RGA) number and have the following information available:

- Customer's name, address, phone and fax numbers.
- A purchase order number (no exceptions) for cases where parts are required that are not under warranty.
- A contact person's name and phone number to call if the equipment is beyond repair or to discuss any other warranty matter.
- Equipment model and serial numbers.
- Reason for return (i.e., repair, warranty, incorrect part, etc.).

We will then fax to your attention an RGA form that must accompany the returned item.

NOTE: THE RGA NUMBER MUST BE CLEARLY WRITTEN ON THE OUTSIDE OF THE PACKAGE(S) BEING RETURNED.

Parts List and Service Guide

When calling Lakewood Instruments, please have the controller's complete model number and serial number available, together with the software version and the software revision so that the technician can better assist you.

When any parts are returned to the factory, please indicate:

- Customer's name and address
- Individual at customer location to send the repaired controller or new part to
- The person (and phone number) to call if the equipment is beyond repair or for any warranty matter

PART NUMBER	DESCRIPTION
35L	4-20 node
RTC	-RTC node
RS2L	COM node

Write your controller's complete model number, serial number, software version and software revision here so that you will have them available if you wish to contact a Lakewood Instruments technician.

Model Number:

Serial Number:

FIRM WARE VERSIONS

Menu	Series	Rev.
I/O		
COM		
RTC		
35L		
NII		
NIO		
RLY		
MCON		
CON1		
CON2		

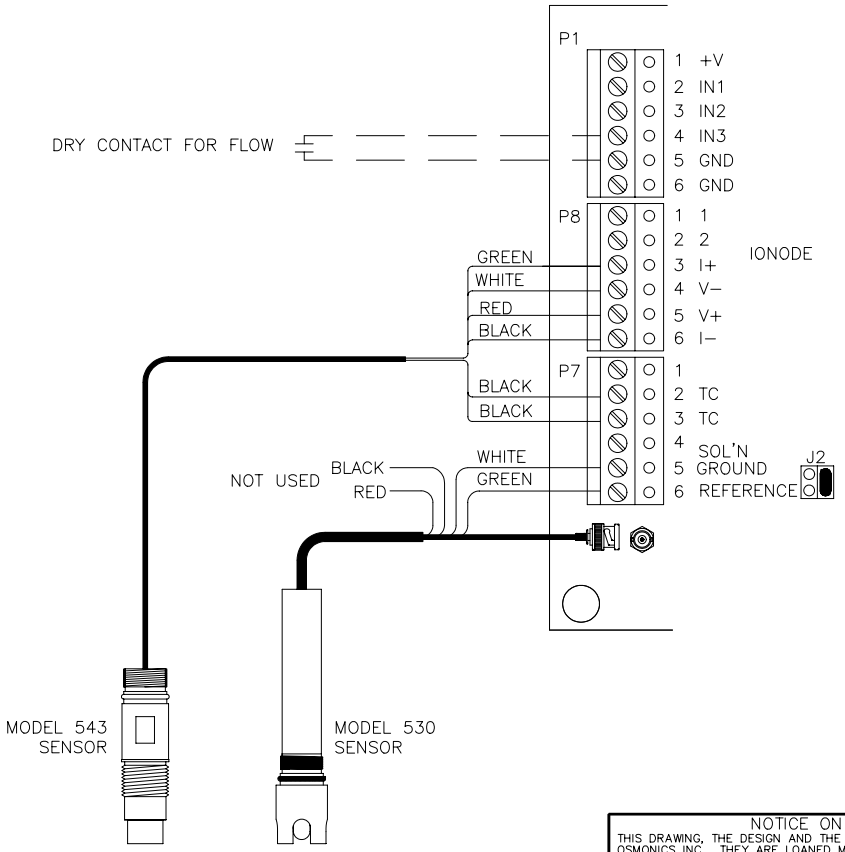
Troubleshooting

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
Conductivity Calibration Error message: "SENSOR READING HIGHER THAN EXPECTED."	The controller is being told the conductivity is 50% less than it thinks it is by default.	Verify that the sensor tip has no accumulated solids and has not bridged to piping (creating a short). Clean tip.
Conductivity Calibration Error message: "SENSOR READING LOWER THAN EXPECTED."	The controller is being told the conductivity is 50% more than it thinks it is by default.	Is the sensor fouled? Are all valves open?
Water meters not accumulating.	There may be a problem with the wiring or the reed switch in the meter may be bad. For water meters other than the contact type, check the manufacturer's user manual for that particular water meter.	Approximately 24 volts DC should be present at the input terminal when the water meter contact is open. That should change to zero VDC when the contact closes. Check these voltages and for correct wiring. Is the controller configured for your type of water meter?
"BLOWDOWN TIME EXCEEDED" alarm.	This indicates that the controller has been trying to reduce the conductivity for longer than the user-programmed time and is unable to reach the setpoint.	Check for proper operation of the blowdown valve. Use the manual relay control to help. Check that the blowdown valve is not stuck closed or restricted. Verify blowdown timeout time is properly set for your application (item #2 in PROCESS menu).
"NODE NOT RESPONDING" error message.	This message occurs when one circuit board in the controller cannot communicate with another board.	Check that all boards are mounted correctly and that all connectors are fully mated. The controller may not have the option board that is trying to be accessed. The board that is trying to be accessed may not be working.

PROBLEM	WHAT THIS MEANS	CORRECTIVE ACTION
Display is blank.	Open the front panel. Look at the yellow LEDs on the rear power board. Are they on?	If LEDs are on, check ribbon cable. Is it properly seated? If LEDs are not on, does the unit have power? If there is power to terminals 2 and 4, replace the power supply assembly.
Conductivity too far from setpoint.	Conductivity is too high or too low in respect to the blowdown setpoint.	Calibrate the controller near the setpoint. Change the setpoint.
Feed Time Exceeded	Relay setpoint was not met in a specified time.	Check chemical, chemical pump. Increase feed time. Reset alarm by creating a “no flow” alarm.
Open TC	Temperature compensator not being properly read.	Check wiring. Replace conductivity sensor.
Shorted TC	Temperature compensator not being properly read.	Check wiring. Replace conductivity sensor.
Fouled Electrode	Conductivity sensor is not reading properly.	Clean sensor. Check wiring. Replace conductivity sensor.

DRAWINGS

REVISION HISTORY					
REV	DESCRIPTION	ECO	DWN	DATE	APVD
A	RELEASE	0451	MLM	4/96	DDR
B	REVISED	1121	EV	8/22/97	



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MATERIAL	TOLERANCES UNLESS NOTED FRAC DECIMALS ANGLES .X ± .1 .XX ± .03 ±1/16 .XXX ± .010 ±.5°	
FINISH		
ORDER NO.	DWN MLM	DATE 4/96
CUSTOMER	CHKD JWZ	DATE 4/96
CUSTOMER LOC.	APVD DDR	DATE 4/96
DO NOT SCALE	APVD	DATE

OSMONICS
PHOENIX OPERATIONS

TITLE
WIRING DIAGRAM
SENSOR WIRING,RING,INPUT WIRING M2430P

SIZE	DWG NO/PN	REV
B	69626	B

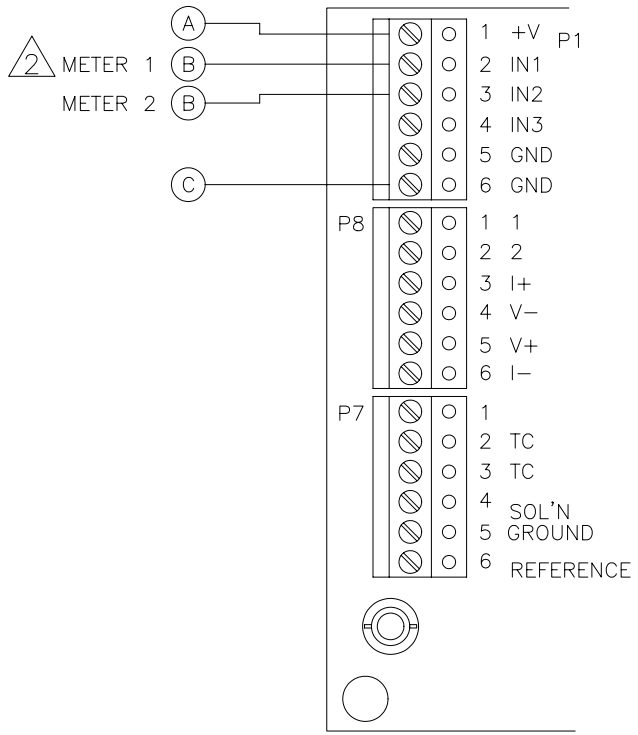
THIRD ANGLE

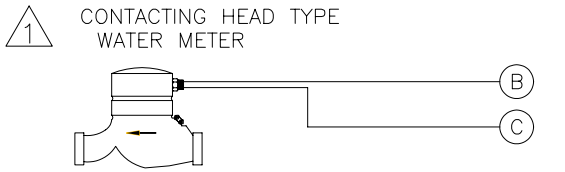
SCALE NONE | FILE TYPE .DWG | SHEET 1 OF 1

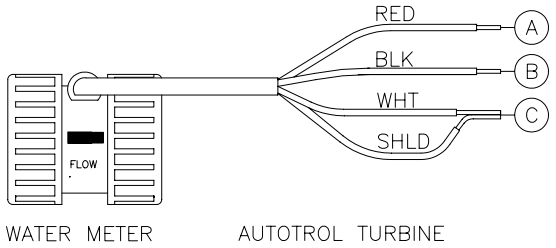
NOTES: UNLESS OTHERWISE SPECIFIED;

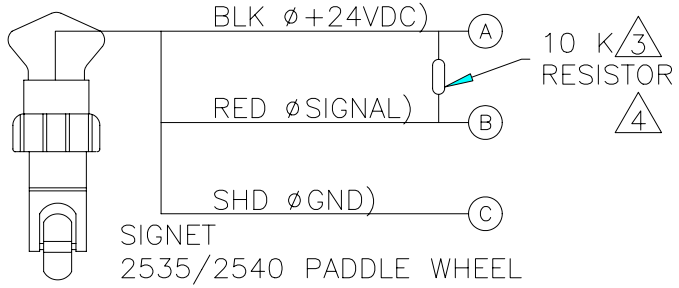
1. 2450: CANNOT BE USED WITH CONTACTING HEAD METER.
2. 2450: METER 1 IS PERMEATE, METER 2 IS CONCENTRATE.
3. CUSTOMER SUPPLIED, 10K RESISTOR ØPULL–UP).
4. ONLY OPEN COLLECTOR OUTPUT WATER METERS MAY BE USED.

REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	1121	EV	8/25/97	
B		REVISED	1285	EV	9/29/97	
C		REVISED	1387	EV	10/9/97	
D		REVISED	1435	EV	11/3/97	JGS
E		ADDED NOTE 3	1541	EV	2/16/98	JGB
F		REMOVED SIGNAL COND BOARD	1743	EV	8/18/98	









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MATERIAL	TOLERANCES UNLESS NOTED FRAC ±1/16 DECIMALS .X ± .1 .XX ± .03 .XXX ± .010 ANGLES ±.5°	
FINISH		
ORDER NO.	DWN EV	DATE 8/25/97
CUSTOMER	CHKD BZ	DATE 8/25/97
CUSTOMER LOC.	APVD JWZ	DATE 8/26/97
DO NOT SCALE	APVD JGB	DATE 8/26/97

OSMONICS
PHOENIX OPERATIONS

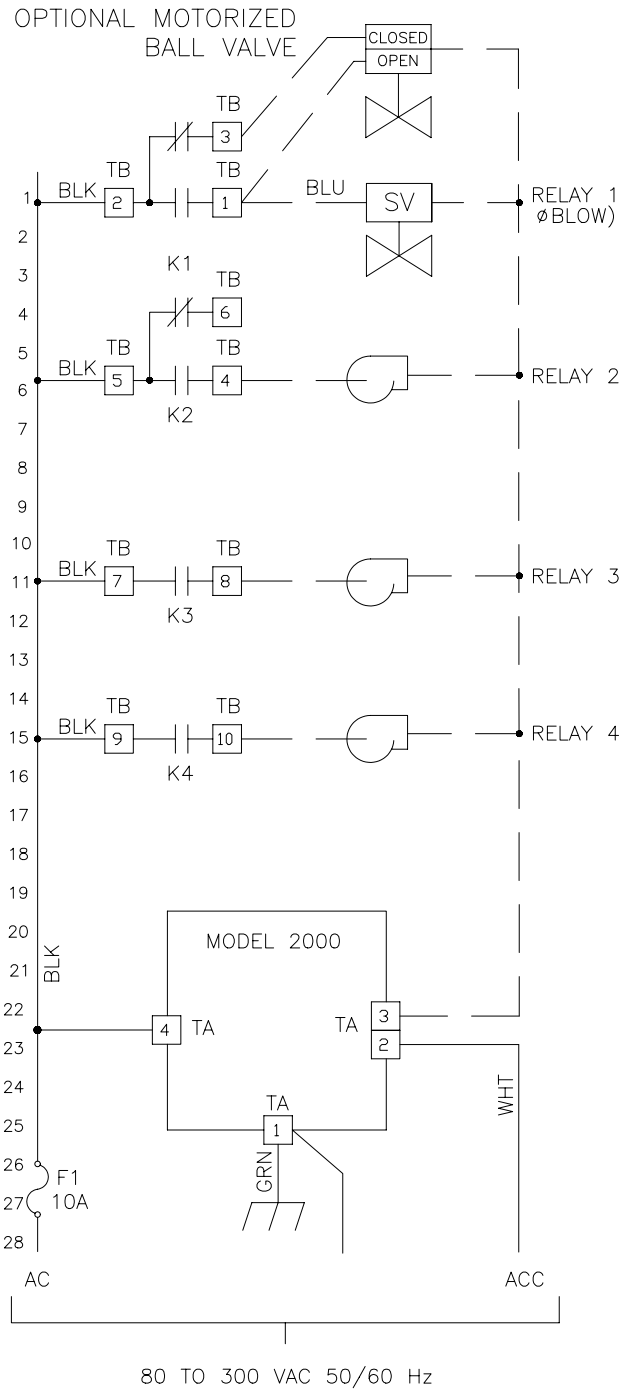
TITLE: WIRING DIAGRAM
WATER METER INPUTS, M–2000 SERIES

SIZE C | THIRD ANGLE | DWG NO/PN 1104607 | REV F

SCALE NONE | FILE TYPE .DWG | SHEET 1 OF 1

P/N 61677 REV-A PG-1/2

REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		PRELIMINARY RELEASE	0964	EV	5/8/97	
B		REVISED	1123	EV	7/3/97	DDR
C		REVISED	1387	EV	10/8/97	



NOTES: UNLESS OTHERWISE SPECIFIED;

1. WIRING BY LAKEWOOD. _____
2. WIRING BY OTHERS. — — — —
3. RELAY CONTACTS RATED 3A/250 VAC, 1/6 HP/250 VAC.

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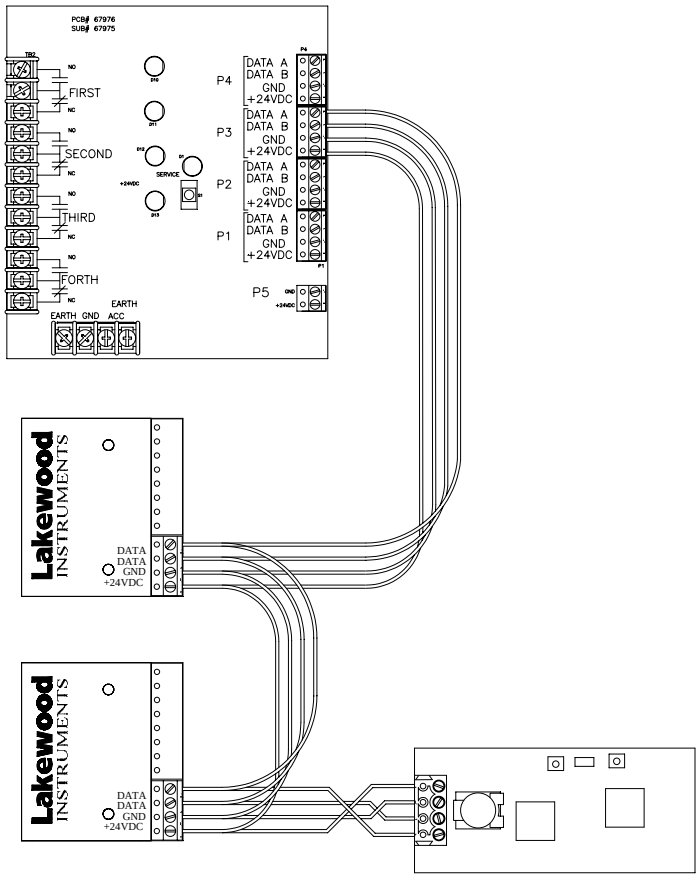
MATERIAL	TOLERANCES UNLESS NOTED FRAC ±1/16 DECIMALS .X ± .1 .XX ± .03 .XXX ± .010 ANGLES ± .5°	OSMONICS PHOENIX OPERATIONS	
FINISH		TITLE	ELECTRICAL SCHEMATIC 2000 SERIES
ORDER NO.	DWN EV	DATE 5/8/97	
CUSTOMER	CHKD BZ	DATE 5/14/97	SIZE C THIRD ANGLE; DWG NO/PN 04277; REV C
CUSTOMER LOC.	APVD DDR	DATE MAY 97	
DO NOT SCALE	APVD	DATE	SCALE NONE; FILE TYPE .DWG; SHEET 1 OF 1

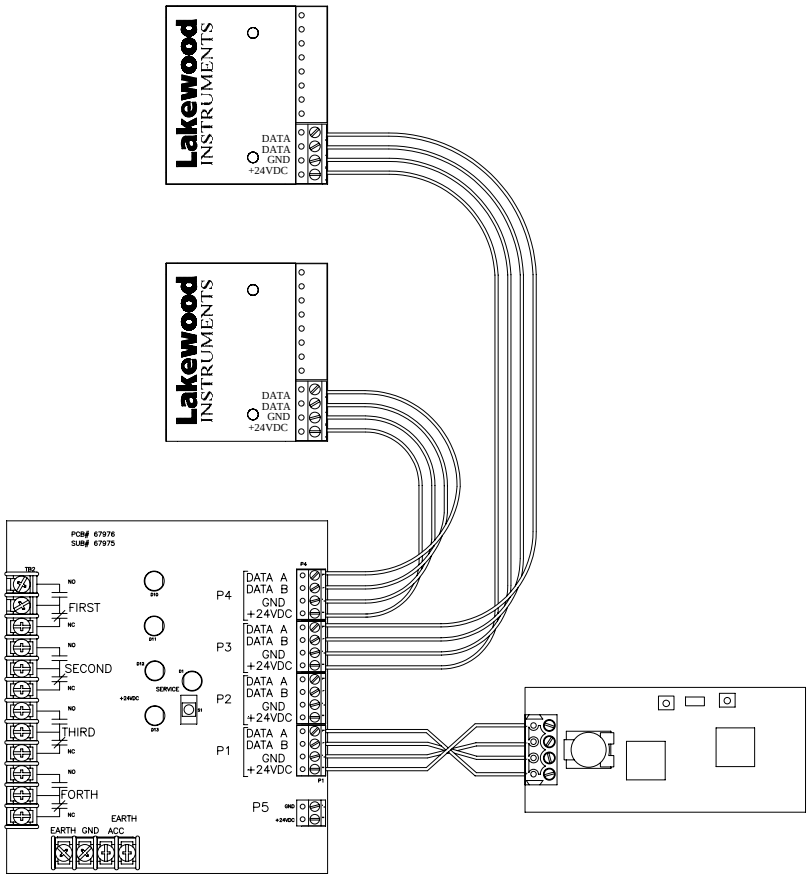
NOTES: UNLESS OTHERWISE SPECIFIED;

1. NIN OPTION PROVIDES +24 VDC TO ALL NODES. IF USING MORE THAN 3 NODES AN EXTERNAL +24 VDC POWER SUPPLY IN PARALLEL IS RECOMMENDED.

REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	1045	EV	8/5/97	



OR



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MATERIAL	TOLERANCES UNLESS NOTED FRAC ±1/16 DECIMALS .X ± .1 .XX ± .03 .XXX ± .010 ANGLES ±.5°	
FINISH		
ORDER NO.	DWN EV	DATE 8/5/97
CUSTOMER	CHKD	DATE
CUSTOMER LOC.	APVD	DATE
DO NOT SCALE	APVD	DATE

OSMONICS
PHOENIX OPERATIONS

TITLE: INSTALLATION DRAWING
NIN OPTION

SIZE	DWG NO/PN	REV
C	04263	A

THIRD ANGLE

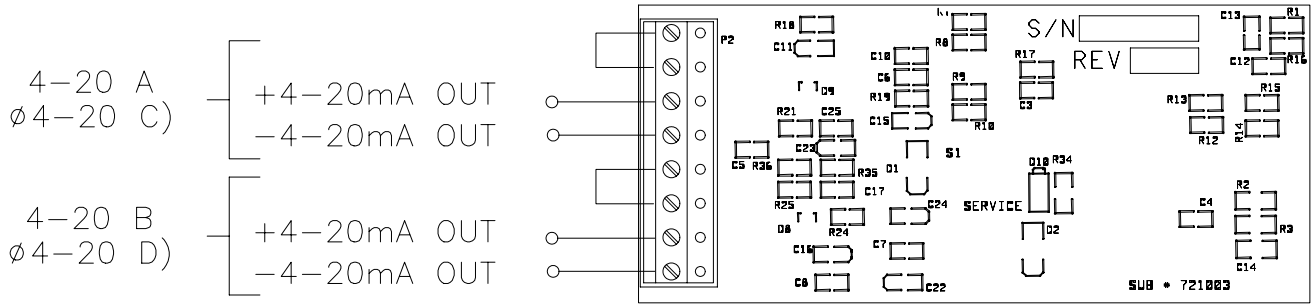
SCALE NONE | FILE TYPE .DWG | SHEET 1 OF 1

P/N 61677 REV-A PG-1/2

REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	0767	EV	9/96	
B		REVISED	1387	EV	10/9/97	

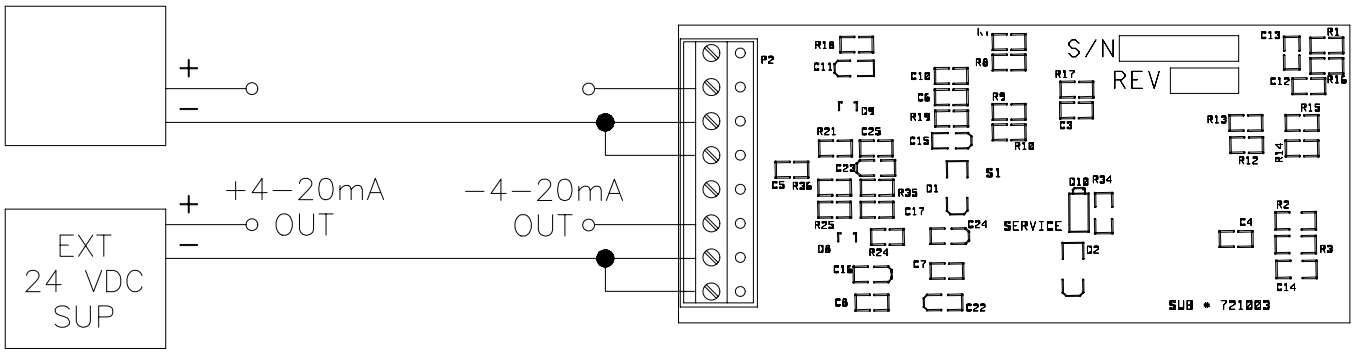
NOTES: UNLESS OTHERWISE SPECIFIED;

1. LOADS MUST BE LESS THAN 600Ω.



INTERNAL POWER

OPTIONAL EXTERNAL 24 VDC SUPPLY



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MATERIAL	TOLERANCES UNLESS NOTED: FRAC ±1/16, DECIMALS .X ± .1 / .XX ± .03 / .XXX ± .010, ANGLES ±.5°	OSMONICS, PHOENIX OPERATIONS
FINISH		TITLE: WIRING DIAGRAM, POWER SUPPLY, 24VDC, 4 TO 20 mA
ORDER NO.	DWN MLM	DATE 9/96
CUSTOMER	CHKD	DATE
CUSTOMER LOC.	APVD DDR	DATE 9/96
DO NOT SCALE	APVD	DATE
SIZE C, THIRD ANGLE	DWG NO/PN 69954	REV B
SCALE NONE	FILE TYPE .DWG	SHEET 1 OF 1

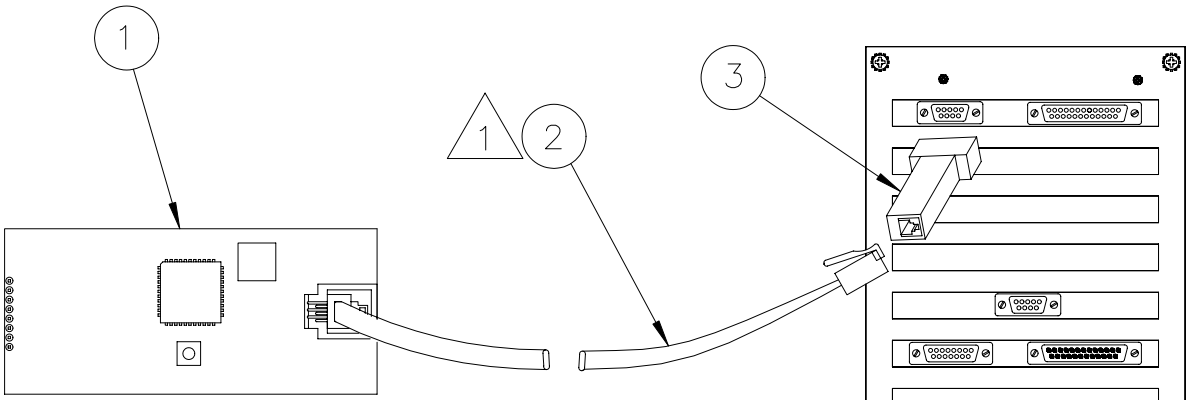
P/N 61677 REV-A PG-1/2

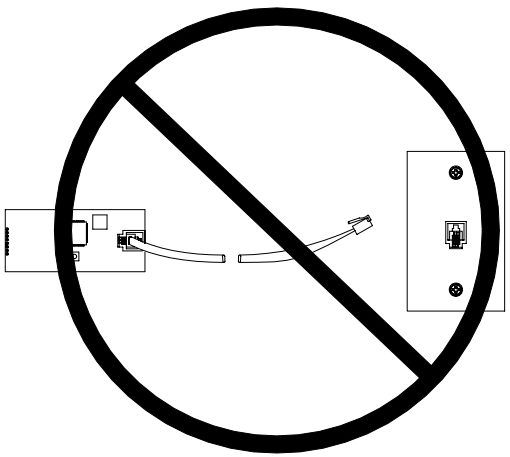
REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A	RELEASE	RELEASE	1387	EV	10/8/97	
B		REVISED	1387	EV	10/8/97	
C		REVISED	1461	EV	11/14/97	JGB

NOTES: UNLESS OTHERWISE SPECIFIED;

1. STANDARD FOUR CONDUCTOR TELEPHONE CABLE UP TO 50 FEET IN LENGTH MAY BE SUBSTITUTED.

PERSONAL COMPUTER WITH MODEM





DO NOT PLUG RS2L DIRECTLY INTO TELEPHONE LINES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL / SPECIFICATION / REMARK	ITEM NO.
1	67369	ADAPTER, 9 PIN	MALE CONN TO RJ11 DTE	3
1	66336	CABLE, RJ11	25 FT	2
1	RS2L	RS2L COM NODE	ASSEMBLED PCB, M-2000	1

PARTS LIST

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OSMONICS
PHOENIX OPERATIONS

MATERIAL
FINISH
TOLERANCES UNLESS NOTED
FRAC ±1/16 DECIMALS .X ± .1 .XX ± .05 .XXX ± .010 ANGLES ±.5°

TITLE: INSTALLATION LAYOUT
RS232 DIRECT CONNECT TO 9 PIN,RS2L

ORDER NO.	DWN EV	DATE 9/19/97
CUSTOMER	CHKD JGB	DATE 5/95
CUSTOMER LOC.	APVD DDR	DATE 5/95
DO NOT SCALE	APVD	DATE

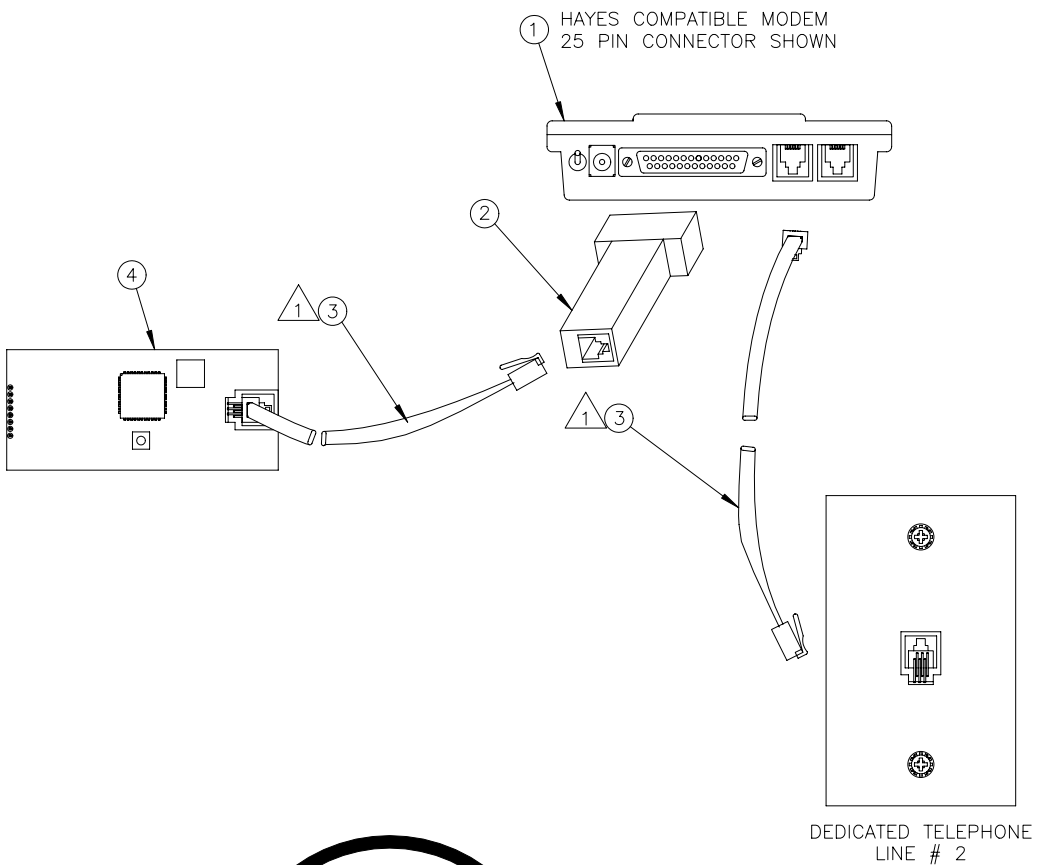
SIZE C | THIRD ANGLE | DWG NO/PN 1169900 | REV C
SCALE NONE | FILE TYPE .DWG | SHEET 1 OF 1

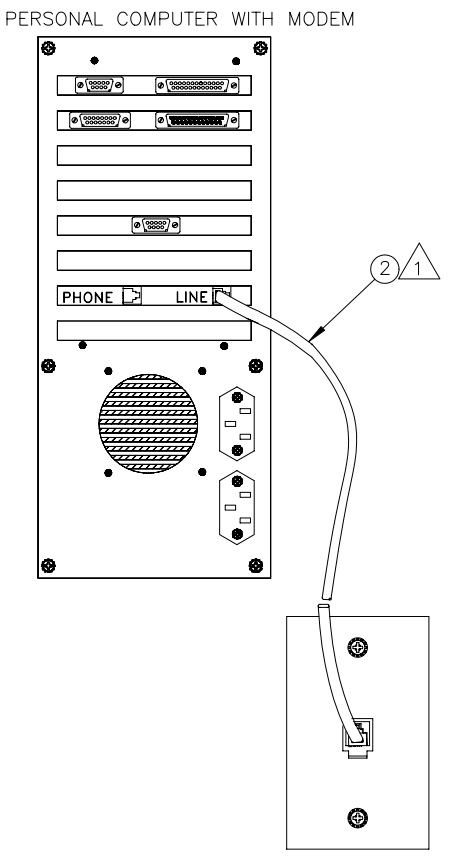
P/N 61677 REV-A PG-1/2

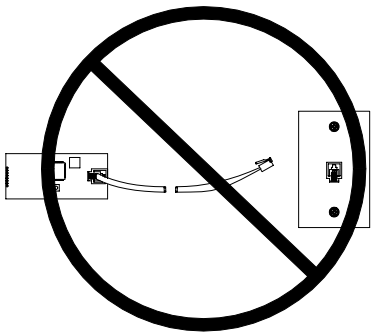
REVISION HISTORY						
REV	ZONE	DESCRIPTION	ECO	DWN	DATE	APVD
A		RELEASE	0147	MLM	4/95	
B		REVISED	0767	MLM	9/95	
C		REVISED	1387	EV	10/8/97	
D		REVISED	1461	EV	11/14/97	JGB

NOTES: UNLESS OTHERWISE SPECIFIED;

1. STANDARD FOUR CONDUCTOR TELEPHONE CABLE UP TO 50 FEET IN LENGTH MAY BE SUBSTITUTED.







DO NOT PLUG RS2L DIRECTLY INTO TELEPHONE LINES

QTY REQD	PART OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL / SPECIFICATION / REMARK	ITEM NO.
1	RS2L	RS2L COM NODE	ASSEMBLED PCB, M-2000	4
1	66336	CABLE, RJ11, 25 FT.		3
1	67765	ADAPTER	25 P MALE D CONN TO RJ11 DTE	2
1	67740	MODEM	HAYES COMPATIBLE	1

PARTS LIST

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OSMONICS
PHOENIX OPERATIONS

MATERIAL
FINISH
TOLERANCES UNLESS NOTED
FRAC ±1/16
DECIMALS .X ± .1, .XX ± .05, .XXX ± .010
ANGLES ±.5°

TITLE: INSTALLATION LAYOUT
COMNODE TO 25P DTE, SER 2000, RS2L

ORDER NO.	DWN MLM	DATE 4/18/97
CUSTOMER	CHKD	DATE
CUSTOMER LOC.	APVD DDR	DATE AUG 96
DO NOT SCALE	APVD	DATE

SIZE C | THIRD ANGLE | DWG NO/PN 1169899 | REV D
SCALE NONE | FILE TYPE .DWG | SHEET 1 OF 1

P/N 61677 REV-A PG-1/2

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